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The Wood-Using Industries of Tennessee

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CLARK W. GOULD

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United States Department of Agriculture

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By CLARK W. GOULD, Forest Agent, and HU MAXWELL, Expert, Forest Service, United States Department of Agriculture

Note.

The investigation upon which this report is based was undertaken by the Forest Service, United States Department of Agriculture, in the spring of 1911, the data collected covering a period of one year, from January 1 to December 31, 1911, inclusive. The work was done under the direction of H. S. Sackett, Chief, Office of Wood Utilization, Forest Service; and the statistics were compiled and the report written by Clark W. Gould, Forest Agent, and Hu Maxwell, Expert. Much assistance was also given in the collection of data by John T. Harris, Statistician in Forest Products.

PREFACE.

Tennessee is 432 miles long, 109 miles wide, and has a total area of 42,050 square miles, of which 300 miles are water surface. The streams within the state, or forming part of its boundary, afford 2,000 miles of navigation, but not during all the year. The surface of the state is mountainous in the east, hilly in much of the central portion, and fairly level in the west. The highest mountains are more than 6,000 feet above sea level, while the western border of the state has an elevation of only a few hundred. Nearly all conditions of surface exist: steep, stony, and precipitous mountains; hills of thin soil, fertile slopes, rich valleys. The rain fall is abundant in all parts; the summers generally are pleasant, the winters mild. Altitude alone produces much difference in climate. The high mountains receive abundance of snow, the low valleys little. Drainage from all of the state is toward the Gulf of Mexico, though some of the rivers flow far to reach their destination.

Tennessee was originally one of the heavy forested regions of this country, and it yet has a large amount of timber. The best was cut when the farms were cleared, and the remnants are still being cut, and will continue for a long time to come to supply lumber to its own people and to the distant markets. In its primitive condition, there was little of Tennessee which was not heavily timbered. There were a few canebrakes along the rivers, but with that exception, the region was an unbroken expanse of timber from the Mississippi River to the summits of the eastern mountains. Some of the finest kinds and the largest trees of the Eastern United States were there. More than three hundred and fifty years ago De Soto, with his army that had marched from Florida, cut his way through woods and reached the Mississippi River near Memphis. Nearly two centuries later a company of French adventurers felled a few trees and built cabins where Nashville now stands. Forty years later the real settlement of the region began along the fertile valleys in the northeastern part of the state, and the forest resources were soon recognized. It was a third of a century before Perry launched his fleet on Lake Erie and reported, "We have met the enemy and they are ours;" that Isaac Shelby constructed a fleet of canoes hewed from enormous yellow poplar trees, and launched them in the Holston River, manned by seven hundred and fifty Tennessee backwoodsmen, and captured the British powder magazines at the mouth of Chicamaugua Creek, and by that bold stroke destroyed the power of England's Indian allies to fall upon the rear of the Carolina settlements in the most perilous period of the Revolution.* Another remarkable fleet was launched in the same region a year later, and under John Donelson conveyed more than 200 settlers to the site of Nashville. The largest vessel carried 100 people. The forty boats descended the Holston and the Tennessee, ascended the Ohio to the mouth of the Cumberland River, and pushed up that stream to Nashville, a distance, following the meanders of the streams, of about 2,000 miles.

Boat building, therefore, appears to have been the earliest important use of wood in Tennessee, except for fuel, and yellow poplar held chief place. The valuable and beautiful tree is at its best in the fertile valleys of Eastern Tennessee, and the pioneers turned to it when they needed canoes to navigate rivers before roads were opened overland.

Not only is Tennessee rich in soil for agriculture, and bounteously supplied with timber for manufacturing purposes, but its rivers will afford abundant water power to turn the wheels of factories for all time. Most of this power is yet undeveloped, but it is a resource in reserve and can be drawn upon when needed. This makes the future sure. Cheap power and abundance of raw material guarantee business during years to come.

The timber resource is only one of many possessed by the state, and, though it is not the greatest, it is of supreme importance. This report is based on statistics collected by the United States Forest Service in 1912, and undertakes to show the condition and scope of the wood-using industries. A year's business is shown; and, in presenting the figures in a series of tables, attempts are frequently made to make clear by discussion the significance of the data. It has not been a part of the plan to give a history of wood utilization in Tennessee. If allusion is occasionally made to isolated instances in past years (as in the above paragraphs regarding the boats built in 1779), the purpose is solely to show that the use of wood in the region is not a new thing, but has a foundation resting on long periods of experience. The real lessons to be taught by studies such as this concern the future rather than the past; for if anything practical comes from such studies it must bear its fruit in years to come. That which manufacturers are now doing should serve as a guide—a starting place, as it were—for the future. They are the teachers, the experimenters, the pioneers whose successes and failures will inspire or warn those who shall follow the same calling in years to come. Important problems are being worked out, and others will demand solution in the future. We are now trying to master the immediate problems, and thereby throw light, if possible, upon questions which will come later. It is not possible to foretell all that wood utilization in the future will attempt and accomplish, but certain lines are indicated by present tendencies. A hundred years ago nobody thought of it, and twenty-five years ago few considered it seriously; but now it is present in the thought and plans of all successful workers in wood.

Another matter which is now attracting more serious attention than ever before is the study of the best uses for each wood. The properties and qualities of woods are considered—strength, elasticity, hardness, color, odor, grain, figure, seasoning qualities. Much of this may be discovered by scientific methods, but some of it is learned only in the school of experience. The tables and discussions in a report like this are really a record of the experiences of men who are working on the problems. Investigation, backed by necessity, is bringing into use many species of wood not usually listed in reports of sawmill output. They are sometimes known as minor species. Every region has a few, and the workers in wood are experimenting with them and finding out what they are good for. Reliable information on the subject, when it is secured, is given in the reports prepared by the Forest Service. In many instances these minor species are meeting part of the demand and lessening the drain upon well-known woods.

The planting and growing of commercial woods are subjects which do not properly fall within the scope of wood-using studies, and for that reason little space is given to them in this report. It is deemed sufficient to point out tendencies and facts which are now apparent and which must speedily affect the available supply on which wood-using industries depend.

Investigation similar to this in Tennessee have already been made by the Forest Service in a number of states, and the results have been published. The class of manufacturing done and the kinds of woods used vary in different regions; but certain prominent and encouraging features stand out prominently in all of them. Wood is being saved, and cheap woods are taking the places of expensive. The Forest Service adheres to one plan in all of this work and attempts to reach every important user of wood. Lists are compiled, letters are written, and blanks to be filled are mailed to all. To those who fail to respond within a reasonable time a second request for information is sent. There are usually a considerable number of manufacturers in a state who fail to respond to both the first and second requests, and they are visited in person. The data secured by correspondence and by the personal interviews with manufacturers are supplemented by studies of various phases of the business in the region, and with this material in hand the report is compiled for publication. It shows the kinds of wood used, the industries which demand the different woods, the cost at the factories, what commodities are made of each and all of the woods, and various other matters. Some attention is paid to markets, though the compilations are not intended to be market reports. Special consideration is given to supply of raw material on which the various wood-using industries depend. The tables are made up to show how much of each species of wood is procured in the state which uses it, and what part comes from other states and countries. As much relative weight is given to the small manufacturer as to the large. In fact, some of the most interesting and valuable experiments in the uses of woods come from small shops.

The Bureau of Census compiles yearly reports of the sawmill output in all the states. Species are separately shown, except that in some instances several are grouped as one. The annual census report should not be confused with the special reports by the Forest Service. The former deals with sawed lumber and rough mill products; the latter takes rough lumber where the census report leaves it and follows it through other processes of manufacture until it reaches its final form in some finished product. Thus the two reports, while dealing with the same material in part or wholly, do not show the same results, and are not meant to do so. For example, the census report takes a maple log as raw material and car-

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*Without boats that remarkable feat would have been impossible, as the army could not have marched the long distance through the woods in time to make a successful attack. In three days Shelby's men rowed down stream three hundred miles, defeated 1,000 Indians, captured the powder, 150 horses, 100 cattle, destroyed 20,000 bushels of corn, and were upon the return, having destroyed their own canoes, which were no longer needed.

ries it through the sawmill, and leaves it as rough lumber. The Forest Service report begins with the rough lumber, carries it through planing machines, and leaves it in the form of flooring, which is a finished product, ready for use. Much lumber goes directly from the mill yard into use without any further manufacture. This report has nothing to do with lumber used in that way; and it is apparent that in states with large outputs of rough lumber the total cut is much above the total quantity further manufactured. For example:

State	No. ft. rough lumber produced for year 1909	Mnfd. products. No. of feet 1910-1911
Kentucky	860,712,000	409,633,800
Louisiana	3,551,918,000	*1,354,954,000
Mississippi	2,572,669,000	618,270,030
Missouri	660,159,000	442,272,993
North Carolina	2,177,715,000	676,166,250
Tennessee	1,223,847,000	413,878,169

* Including large quantity which was simply planed.

States with little timber and large manufactures may work much more into finished products than their sawmill cut. What the state can not furnish in the way of rough lumber the factories draw from the outside. Illinois is such a state. Its lumber cut in 1909 was 170,181,000 feet; its factory output 1,781,536,120,000 feet, or more than ten times as much.

The manufacturers in Tennessee are favorably situated in regard to markets. Railroads are ample, and distances to the best markets are moderate. Some of the largest shippers figure that ten or more states, extending from Texas to Virginia, lie so convenient as to make them peculiarly suited to trade with Tennessee; and, of course, a much wider territory lies only a little further away.

The output of sawmills in Tennessee according to the Federal census was:

894,968,000 feet in 1907
790,642,000 feet in 1908
1,223,849,000 feet in 1909
1,016,475,000 feet in 1910

must be. Some woods possess qualities fitting them for many purposes, though they have not yet been much used. The size of a tree is not a sure guide by which to judge its place as a commercial wood. Occasionally, species which are scarcely more than shrubs, as the mountain laurel or the nannyberry, are quite useful for certain purposes, while others though of good size, as the planer tree, are seldom reported in use for any purpose. Manufacturers in Tennessee reported 46 woods in use. The number is disappointing, but its smallness is apparent rather than real. Doubtless twice that many are in use. The custom prevails in Tennessee as in many other parts of this country of giving a single name to many closely-related species. The hickories are an example. Half a dozen hickories grow in Tennessee, and all are in use, yet the common name hickory is applied to all because it is not easy to distinguish one from another in the lumber yard or the shop, though the woodsmen generally know the species apart. The forests of Tennessee contain the following species of hickory:

Pecan—Hicoria pecan.
Bitternut—Hicoria minima.
Nutmeg hickory—Hicoria myristicaeformis.
Water hickory—Hicoria aquatica.
Shagbark hickory—Hicoria ovata.
Shellbark—Hicoria lasiniosa.
Mockernut—Hicoria alba.
Pignut—Hicoria glabra.
Paleleaf—Hicoria villosa.

The list of oaks native to Tennessee is double that of the hickories. Two or more pines not mentioned in the reported species are doubtless in use. At least a score of minor species—that is, woods not usually considered in sawmill output—grow in Tennessee in amounts sufficient to give them value, and not one is listed in reports by manufacturers, though there can be little question that all are in use. They are either not reported at all, or they are grouped under other names. If all of them were duly considered they would not add greatly to the total quantity, but they would probably double the number of species reported.

Tennessee is thus shown to have nearly one-third of all the species of trees in the United States. It would be difficult to find a similar area in this country possessing an equal number, though the total quantity of timber in some other regions of equal size is much greater.

The Pines.

Though six pines are native to Tennessee, only four were reported in use in the States, and one of these, longleaf pine, came wholly from without. Table 1 lists the pines in use and shows the annual amounts demanded and how much grew in the state and how much came from elsewhere. The detailed statistics of woods in use, which are shown in that table, are not repeated in this discussion, but certain facts or conclusions not included in the table are presented here.

SHORTLEAF PINE—This grows in Central and Western Tennessee, but is rare or totally wanting in the mountains of the east. In the region where it grows it is not equally dispersed, but is found in some localities and is wanting in others. No large areas in Tennessee are heavily timbered with this species, as some parts of Missouri, Arkansas, Louisiana, and Mississippi are, or were once. It reproduces vigorously, however, and where other timbers have been removed and space is given it the shortleaf pine spreads rapidly and holds its place well. No loblolly pine was reported by manufacturers, but it grows in the southern part of the state, and there is little doubt that a considerable amount is in use. It has been perhaps reported as longleaf or shortleaf. The wood is more like the latter than the former.

WHITE PINE—This valuable timber is found in the mountains of Eastern Tennessee and in rather large amounts. In 1910 the sawmills of that region cut more than 39,000,000 feet of it. The white pine is hardly ever mistaken for any other. It is an imposing forest tree, with an individuality so marked that it may be recognized by its form alone at distances so great that the usual botanical characteristics cannot be distinguished. Nor is any lumberman disposed to call it by any name but its own. It never sails under false colors as some other woods occasionally do, though other woods frequently take the white pine's name and thus gain easy access to markets which would be hard to break into under their own names. This white pine is the same species as that which so long supplied markets in New England, Pennsylvania and the Lake States. It is officially called white pine, and no other goes by that name. In Tennessee the white pine approaches the Southern limit of its range. It is a Northern tree, but it has followed the cool mountain ranges southward from New York, across Pennsylvania, West Virginia and Virginia, to the highlands of Tennessee and Western North Carolina. As is the case with most species as they approach the limits of their range, the white pine of the Southern mountains is not quite equal to the best of New England and the Lake States. The wood is generally considered a little harder and the knots darker in color in the South. Neither does it grow as large as in the North, nor does it reproduce as vigorously. In spite of this, however, it is a valuable timber, though the manufacturers in Tennessee seem to have used less than six per cent of the state's sawmill cut of this species. The records do not show what became of the balance, though it is likely that most of it went to manufacturers in other states. The average cost of that bought in Tennessee was low, $16.27. The mill yard value in 1909, according to the census report, was $18.21. Over 40 per cent of the white pine reported by manufacturers in Tennessee was bought by boxmakers who use low grades. That helps to explain why the price of this wood at the factory was lower than the average value at the sawmill—Tennesseans do not use the best grades of their white pine.

TABLE MOUNTAIN PINE—This scarce and little known tree reaches its best development in the mountains of Eastern Tennessee, though its range extends northward in certain restricted localities, through West Virginia, Maryland, and Pennsylvania. So restricted was its range once believed to be that its discoverer, the younger Michaux, a French botanist, wrote more than a hundred years ago that he believed the only place where this tree existed was on a certain flat-topped mountain in North Carolina; hence he called it table-mountain pine. It is now known that he greatly underestimated the extent of its range. On some of the mountains of Eastern Tennessee it is the most abundant pine. The amount put to use in Tennessee is moderate, but it is interesting because no other state, as far as shown by reports to the Forest Service, has made any use of the wood except that a little has been burned for charcoal in Pennsylvania.

PITCH PINE (PINUS RIGIDA)—No manufacturer in the state reported the use of this pine, though there is no doubt that many have been using it for a number of purposes, but have listed it under some other name, or failed to include it. It is generally called black pine in Eastern Tennessee, particularly in the regions of white pine, the purpose being to distinguish between the two species

SUMMARY OF KINDS OF WOOD USED IN TENNESSEE.
Table 1.

Kinds of Wood: Common name — Botanical name	Quantity used annually feet B. M.	Quantity used annually per cent	Average cost per 1,000 ft	Total cost f. o b. factory	Grown in Tennessee per cent	Grown out of Tennessee per cent
White Oak—Quercus alba	61,877,787	14.95	$ 25.37	$1,569,836	83.01	16.99
Shortleaf pine—Pinus echinata	54,545,245	13.18	16.18	882,349	43.16	56.84
Yellow poplar—Liriodendron tulipifera	51,137,820	12.36	21.45	1,097,094	89.79	10.21
Red oak—Quercus rubra	50,156,500	12.12	23.57	1,182,170	72.14	27.86
Red gum—Liquidambar styraciflua	50,027,428	12.09	13.83	83	62.07	37.93
Hickory—Hicoria	32,485,976	7.85	22.80	740,[illegible]8	81.47	18.53
Cottonwood—Populus deltoides	28,760,747	6.95	21.51	618,617	47.48	52.52
Longleaf pine—Pinus palustris	19,195,096	4.64	20.23	388,364	.....	100.00
Chestnut—Castanea dentata	13,823,555	3.34	26.45	365,689	35.43	64.57
White ash—Fraxinus americana	7,054,000	1.70	22.23	156,798	48.61	51.39
Cypress—Taxodium distichum	6,780,339	1.64	28.66	194,346	.....	100.00
Red cedar—Juniperus virginiana	6,532,293	1.58	11.71	76,525	78.57	21.43
Basswood—Tilia americana	6,028,833	1.46	19.66	118,515	84.21	15.79
Beech—Fagus atropunicea	5,825,000	1.41	17.39	101,297	51.93	48.07
Buckeye—Aesculus octandra	2,839,617	.69	17.19	48,827	97.36	2.64
Sugar maple—Acer saccharum	2,719,000	.66	19.55	53,149	83.08	16.92
White pine—Pinus strobus	2,256,610	.55	16.27	36,713	93.63	6.37
Dogwood—Cornus florida	1,705,000	.41	22.07	37,627	69.21	30.79
Birch, sweet and yellow—Betula lenta and lutea	1,363,000	.33	35.84	48,850	23.33	76.67
Black gum—Nyssa sylvatica	1,033,000	.25	10.61	10,959	100.00	.....
Sycamore—Platinus occidentalis	724,000	.17	14.26	10,327	81.08	18.92
Black ash—Fraxinus nigra	715,000	.17	13.96	9,980	2.10	97.90
Persimmon—Diospyros virginiana	680,000	.16	26.99	18,350	26.47	73.53
Silver maple—Acer saccharinum	543,000	.13	13.45	7,305	73.30	26.70
Hemlock—Tsuga canadensis	523,825	.13	10.90	5,711	21.00	79.00
Black walnut—Juglans nigra	520,000	.13	25.26	13,136	23.85	76.15
Chestnut oak—Quercus prinus	500,000	.12	16.50	8,250	100.00	.....
Black cherry—Prunus serotina	453,000	.11	25.35	11,485	15.45	84.55
Black willow—Salix nigra	450,000	.11	10.57	4,755	72.22	27 78
White elm—Ulmus americana	425,000	.10	24.74	10,513	87.06	12.94
Sassafras—Sassafras sassafras	336,000	.08	20.04	6,734	99.11	.89
Shittimwood—Bumelia lanuginosa	291,308	.07	17.47	5,088	100.00	.....
Hackberry—Celtis occidentalis	250,000	.06	12.50	3,125	50.00	50.00
Tupelo—Nyssa aquatica	237,000	.06	22.11	5,239	36.71	63.29
Texan oak—Quercus texana	211,056	.05	18.49	3,903	.....	100.00
Mahogany—Swietenia mahogani	183,000	.04	134.54	24,620	.....	100.00
Yellow oak—Quercus velutina	170,000	.04	14.94	2,540	100.00	.....
Cucumber tree—Magnolia acuminata	125,000	.03	10.00	1,250	100.00	.....
Slippery elm—Ulmus pubescens	115,000	.03	15.19	1,747	100.00	....
Largetooth aspen—Populus grandidentata	100,000	.02	25.00	2,500	100.00	.....
Butternut—Juglans cinerea	94,000	.02	13.45	1,264	100.00	.....
Table mountain pine—Pinus pungens	30,000	*	12.00	360	100.00	.....
White cedar—Thuja occidentalis	25,000	*	7.48	187	100.00	.....
Bur oak—Quercus macrocarpa	16,132	*	20.02	323	100.00	.....
Osage orange—Toxylon pomiferum	8,000	*	200.00	1,600	.....	100.00
River birch—Betula nigra	6,000	*	12.00	72	100.00	.....
Totals	413,878,167	100.00	$20.73	$8,580,440	63.61	36.39

*Less than 1-100 of 1 per cent.

Commercial Woods of Tennessee.

The state's vertical range of more than 6,000 feet from the flood plains of the Mississippi River in the west to the highest mountains of the east is responsible for the extraordinary number of tree species in Tennessee. Those of the swamps and lowlands, such as the cypress, tupelo, and evergreen magnolia, are found in the flat regions of the west. The oaks, maples, beech, birches, and some of the pines grow in the elevated valleys and among the hills in the central and eastern regions; and white pine, table mountain pine, the hemlocks, several oaks, and other hardwoods are found among the mountains. Some, as the hickories and yellow poplar, grow in practically all parts of the state.

The total number of commercial woods indiginous to the region can not be definitely stated for the reason that there is no exact definition or agreement as to what a commercial wood is. To fall in that class, it must be in use, but there may be difference of opinion as to how general that use

A report issued in 1910 by the Tennessee State Geological Survey and compiled by R. Clifford Hall of the United States Forest Service, listed tree species native to Tennessee as follows:

Pines	6
Spruces	2
Hemlocks	2
Fir	1
Cypress	2
Cedars	2
Walnuts	2
Hickories	10
Willows	4
Cottonwoods	3
Birches	3
Oaks	19
Elms	6
Hackberries	4
Ashes	6
Magnolias	5
Maples	10
All others	63
Total species	150

by calling one white and the other black. It is fairly abundant in an area of some thousands of square miles in the eastern part of the state. Most of the trees are small and short, but where conditions are favorable saw-logs are cut. The lumber is used more in the rough than in the finished condition, but some goes through wood-working machines and is made into frames and flooring. Box and vehicle makers use some of it. The wood is of rather low grade compared with most other pines. It is 64 per cent as strong and 39 per cent as stiff as longleaf and about three-fourths as heavy. Few other trees withstand forest fires as well as pitch pine, and it can maintain itself on very poor land. The stand is generally thin.

SCRUB PINE (PINUS VIRGINIANA)—This is another tree not reported by any manufacturer in Tennessee, though some of it is used. It is one of the poorest of the pines, small in size, unpromising in form, with characterless wood. It makes good boxes and crates.

The Oaks.

Users of wood usually separate oaks into two classes, white and red. That classification holds only in a general way, for the rule is subject to many exceptions. The color of the wood determines the class, as understood by actual users. Sometimes the classification includes the chestnut oaks, thus making three classes instead of two. This is not a botanical division, and takes little account of leaves and acorns, but is intended for convenience only among users of wood. In Tennessee the manufacturers reported five oaks by name, and perhaps used a dozen others which they included under one or another of the five names.

THE WHITE OAKS—Speaking in a general way, the oaks used in Tennessee under the name of white oak are post oak (Quercus minor), bur oak (Quercus macrocarpa), overcup oak (Quercus lyrata), and white oak (Quercus alba). The last named is the true white oak, the type of the group, the most abundant, and the best of all when all things are considered.

THE RED OAKS—There are more species in the red oak group as classified by users of the wood in Tennessee. The type of the group, and therefore the genuine red oak, if one of the group can be more genuine than another, is the Quercus rubra, which is the only tree called red oak in the Forest Service's official check list. It is best developed in regions north of Tennessee, but extends into that state where much good timber is cut. Table 1 credits this species with 50 million feet, as reported by Tennessee manufacturers; but this is partly made up by counting a number of other oaks. Those so included are probably the following: Texan oak (Quercus texana), yellow oak (Quercus velutina), Spanish oak (Quercus digitata), pin oak (Quercus palustris), blackjack oak (Quercus marilandica), water oak (Quercus nigra), shingle oak (Quercus imbricaria), and willow oak (Quercus phellos).

THE CHESTNUT OAKS—Only half a million feet was reported under this name and it may all have been the true chestnut oak (Quercus prinus), but three other species belonging to this group grow in Tennessee and some of each may be included. They are: Chinquapin oak (Quercus acuminata), cow oak (Quercus michauxii) and swamp white oak (Quercus platanoides). These oaks have leaves resembling those of the chestnut, hence the name; but the oaks of the other groups, white and red are so called from the color of the wood and not from the shape of the leaves.

The Hemlocks.

A little more than half a million feet of hemlock was reported in the state, and most of that came from other states. It is not, therefore, of a great deal of importance in Tennessee from the manufacturer's standpoint. In 1910 not a single mill reported hemlock in its output in the state. Nevertheless, some of it was cut. Two species grow among the mountains of Eastern Tennessee. The Northern hemlock follows the mountains that far southward and is found along the water courses and on steep, damp slopes on the upper tributaries of the Tennessee River. The other species, the Carolina hemlock, is scarce.

The Cedars.

Though manufacturers report the use of two species of cedar in Tennessee, the correctness of the reports may be questioned with regard to Northern white cedar (Thuja occidentalis), yet it is not impossible that some of it was cut on the high mountains of Eastern Tennessee and made into penholders, as stated. The species there approaches the extreme Southern limit of its range and grows on high and rugged mountains, the trunks being small, crooked, and difficult to procure. More likely the white cedar listed was the white sapwood of red cedar.

RED CEDAR—Tennessee is the home of this fine wood. The state has produced great quantities in past years, and it is generally considered that the species is more highly developed there than anywhere else. It has a wide range, and, if closely related species are included, it is found in all regions of the United States. Its form is more like a park tree than an uncared-for inhabitant of the forest. Its tall, sharp, conical crown looks as if the gardener's pruning shears might lately have been at work upon it. The trunk is occasionally fluted and not of best form, but the top is almost faultless, unless the tree has met with some accident or is very old. It grows in every part of Tennessee, but is now most conspicuous on thin land and dry ridges. That is because it has been cut from the best land. It is so tenacious of life, and ekes out a living under circumstances so adverse, that in many parts of the state it is nearly the only tree to be seen on rocky bluffs, gravelly flats, and sterile ridges. Other species have starved out and have given up the ground to the red cedar. It has entered into possession and is making good. It is one of the most valuable forest trees of Tennessee. In 1910 the sawmill cut was 31,000,000 feet, and that did not represent half of the output. Millions of posts and poles were cut and were shipped to many parts of the country. The drain has been enormous, and it looks as if the end must be near; but in spite of appearances the red cedars keep on coming, new thickets spread into cut-over land and untold thousands of young trees take the places of those cut for the markets.

It is a tree of slow growth, but it keeps at it. Specimens as large as those in the original forests need not be looked for again, for centuries would be needed to produce them. Early settlers found it the most available farm timber in many localities, and cedar rails fenced the farms, cedar logs built the barns, cabins and mills, and in many cases cedar fuel warmed the houses, and cedar furniture fitted them for occupation. It became the greatest pencil wood because it is soft, light, odorous and handsome. Pencil manufacturers in this country and in Europe have ransacked the state for suitable timbers and have taken most that is fit. The small trees escape that search because they are too knotty for pencils and do not contain enough red heartwood, nor are they of the desired whittling qualities.

Cottonwood.

Two woods are reported in Tennessee belonging in the cottonwood group: the common cottonwood and the large-toothed aspen. Only 100,000 feet of the latter was used and 28,000,000 of the former.

Some peculiarities are found in the reports of the uses of cottonwood in Tennessee. The total quantity is shown above. The total saw mill cut, including the veneer cut in the state, according to the latest available statistics, is less than what the manufacturers use of state-grown wood. The discrepancy may be accounted for on the assumption that much of the cottonwood going to the factories was in the log, and was not counted in the census returns of mill output. The country's cut of cottonwood is declining. In 1899 it was 415,000,000 feet, and fell off 36 per cent by 1907, and declined 45,000,000 feet further by 1910. The mill output for Tennessee in 1909 was over 18,000,000 feet, and in 1910 had fallen below 9,000,000. The conclusion is that this wood is approaching practical exhaustion.

The Ashes.

Four or more species are used in Tennessee, but only two are reported. The wood in all is much alike and the user frequently cannot tell the exact species he has in hand, so he gives it the name of the species he knows best, usually the white, but if not that, the black. The species makes little difference to the man who manufactures some commodity, so long as the wood is satisfactory, and most of the ashes give satisfaction. The two species reported are: White ash (Fraxinus americana), and black (Fraxinus nigra); while the two most plentiful of the unreported species are red ash (Fraxinus pennsylvanicum), and green ash (Fraxinus lanceolata). It may be noted that these woods are designated by colors—white, black, red and green.

The Elms.

White elm and slippery elm were reported in small quantities. The former is the most common elm in this country and is native in nearly all the states east of the Rocky Mountains. The slippery elm is not so common, but where it exists it is best known on account of its mucilaginous inner bark which was formerly a household remedy for most external injuries. The bark is sold in nearly all drug stores. The wood of this tree is rather deeper in color than that of the white elm, and for that reason is known in some localities as red elm. Two other trees of the elm genus are common in Tennessee and are in general use, but chiefly under the name of white elm, or some other of the multitude of names with which most of the elms are burdened in the regions where they are in commercial use. The cork elm (Ulmus racemosa) is so named because of thickenings, ridges and excressences of the bark, resembling cork. The wood is of good quality and is suitable for many purposes, but like all the other elms it has no grain or figure of a kind to give it attractive appearance. Wing elm (Ulmus alata) also owes its name to peculiarities of its bark. Flat keels on the opposite sides of small twigs resemble wings. They are about as thick as heavy paper, and range from one-fourth to one inch in width, measured from the center of the twig outward. They sometimes occur on larger limbs and on the trunks of small trees. When the branches are bare of leaves, the peculiar appearance of winged branches and trunks seldom fails to arrest attention. Rock elm is a name often applied to trees of this genus. There is no such species. It is simply a name which in different regions is applied to whatever elm happens to grow of best quality there. Sometimes it means the white elm, sometimes slippery elm, and again some one of the others. "Rock oak" is a name applied in much the same way to the oaks, and "rosemary" to some of the Southern yellow pines. The custom of the community must be understood before one can determine what trees these names are meant to designate.

The planertree (Planera aquatica) resembles the elms so closely that distinctions are often not made by users of the wood. None was reported in Tennessee, though it is well known that lumbermen cut the planertree when they come to it in course of their logging operations, and the saw mills convert the logs into lumber. In most places it goes into the elm lumber piles and loses its correct name.

The Gums.

Three woods in Tennessee belong to this group and the common name "gum" is frequently applied to each and all, but at other times they are considered separately. They have some characters in common, but they have differences also.

RED GUM—In 1910 Tennessee sawmills cut 62,000,000 feet of this wood, which was about one-tenth of the cut in the United States. The largest output was in Arkansas, next in Mississippi, Missouri was third, and Tennessee stood fourth. A large amount was made into veneer in addition to the sawmill product of lumber. In Tennessee the veneer output of red gum is about one-fourth of the lumber, or 15,000,000 feet. Practically all of the veneer is rotary cut and the quantity given is based on log measurement. Much of the veneer is used by manufacturers of boxes and crates, but a large amount is demanded by furniture makers. Some of it is finished to imitate more costly woods. The seasoning problem is a serious one with red gum intended for fine work. The wood contains an oil which makes gluing difficult, unless the wood is thoroughly dried. It has been mastered by many manufacturers who now produce excellent furniture and finish made wholly or partly of the wood. Its beauty is widely known. In fact, its beauty is known by many who do not know the name of the wood they admire, but who suppose it is black walnut, white oak, sweet birch, cherry or Circassian walnut. Men well acquainted with the lumber industry predict that red gum has not yet reached the position which it is destined to attain in this and other countries.

TUPELO—This wood is not very important in Tennessee, but some of it is cut there, usually associated with cypress in swamps and near water courses. It is often known commercially as bay poplar—a term which it is claimed was originally employed to convey the impression that it was yellow poplar (Liriodendron tulipifera). The "bay" referred to the fact that the trees grew close to water, particularly the southern part of Chesapeake Bay. The bark of the tupelo bears rather close resemblance of that of yellow poplar, and the wood of certain trees looks much like the yellow poplar's wood. Botanically, the trees are quite different.

BLACK GUM—Manufacturers in Tennessee used more than a million feet of this wood last year, all of which was grown in the state. The Bureau of the Census, in returns for 1910, included black gum with tupelo and separate figures were not given. It grows in all parts of Tennessee, not in thick stands like some other species, but here and there through the forests. It is one of the most unwedgeable woods of this country. The fibers so cross and interlock that no line of cleavage can be found. For that reason, it has been much used for mauls. They can be beaten into splinters before they will split. The black gum mauls of early times pounded out many millions of fence rails for farm fences. In very cold weather, however, such mauls could not be used, for when frozen they burst under the impact of heavy blows.

Birch.

Several species of birch contribute to the lumber supply of this country, and when the wood reaches the manufacturer who makes furniture, finish and other commodities of it, it is not always possible to determine what species is used. Any one or all of three species may be used in Tennessee. Forty-five mills cut birch in this state in 1910. Sweet birch (Betula lenta) grows in the mountains, and with it occurs the yellow birch (Betula lutea). Both species contribute to the commercial birch lumber of the markets. It can not be stated what proportion of each was reported by manufacturers in Tennessee who used 1,363,000 feet. Three-fourths of it came from outside the state. That brought from the Lake States was chiefly yellow birch, while Pennsylvania and West Virginia

contributed sweet birch, and most of what was cut in Tennessee was sweet birch. The most abundant birch in the state is neither of these, but the river birch (Betula nigra). It is not much sought after because it lacks grain and figure to make it attractive. Moderate success has attended efforts to stain it in imitation of other woods. The tree grows along river banks and is easily recognized by the ragged appearance of its trunk, covered with hanging rolls and tatters of light brown bark, which the tree seems to be always in the act of shedding.

The Hackberries.

Two species of hackberry occur in Tennessee both passing by that name. They are much alike and while botanists recognize both, the lumberman does not. In fact, as often as not, hackberry is classed as ash at the mill yards and is sold as such. Hackberry (Celtis occidentalis) and sugarberry (Celtis mississippiensis) may grow side by side, but in most regions where both occur the former is most abundant.

The Maples.

Two species of maple are reported by manufacturers in Tennessee, aggregating about three and a quarter million feet. In 1910 there were 229 mills in the state cutting maple, but in small amounts for the total product was little more than the total used by manufacturers. In all parts of the maple region east of the Rocky Mountains it is the custom of users to recognize two kinds of maple generally termed "hard" and "soft." These names do not conform very closely to species, for half a dozen are called by the former name and occasionally more than one by the latter, though usually soft maple means the silver maple (Acer saccharinum). Hard maple, or sugar maple, (Acer saccharum) is the most abundant of the maples in Tennessee. It is the tree which produces sugar in early spring. Others which are found in the state, and which are commonly classed as hard maple, are mountain maple (Acer spicatum) a small tree called low maple in Tennessee because it is apt to grow near mountain water courses; the striped maple (Acer pennsylvanicum); black maple (Acer saccharum nigrum); red maple (Acer rubrum); and Drummond maple (Acer drummondii) in Southwestern Tennessee. This tree is scarce and is generally small. To these should be added the box elder (Acer negundo) which in spite of its name belongs with the maples. It is not an important timber tree in the state, nor anywhere else, but is sometimes used. The black maple may be recognized by the dark color of the bark which characteristic is more noticeable in winter than in summer, but the bark alone is not an unerring criterion in determining the species. The red maple is so called from the bright color of its winged seeds which make a fine display in early spring. In Tennessee this tree occupies swamps and in the western part of the state closely resembles the Drummond maple.

The Walnuts.

Black walnut and butternut are both reported by Tennessee manufacturers, the former in larger quantity than the latter, though most of the black walnut came from outside the state, while all of the butternut was home grown. Butternut is known also as white walnut, a name which in early times was often applied to hickory. The heartwood of butternut is lighter in color than the heart of black walnut, but otherwise the woods bear close resemblance. The black walnut is generally regarded as more handsome. Neither of them should be counted on for a large part of the future lumber supply. The butternut never contributed much, but twenty-five years ago and longer ago than that black walnut was in great demand for furniture. It is not now in fashion in this country, and, besides, it has become scarce and high priced. The best wood comes from large trees because they have comparatively more heart than small trees and it is blacker and of finer grain. Black walnut has long been, and still is, the choice wood for gun stocks and pistol grips. Some prefer the softer toned wood from the planted walnut trees of Europe. Tennessee produces good walnut, but the best was long ago cut and not much young growth is coming on. Trees in the open may be worth more for their annual crops of nuts than for lumber. In some of the northern states the butternut pays better if left to bear nuts when other forest trees are cut from around it. It might be more profitable to let the Tennessee butternut stand. The average value of the wood at the factories was only $13.45.

Other Hardwoods.

A number of other hardwoods went to the factories in Tennessee, some in a small way, others in large amounts. The particular commodities made wholly or in part from each are shown in the various industry tables in this report; but the importance of the several species as a resource in Tennessee is not always apparent in these tables. A wood must be fairly abundant and must be fit for something in particular to make it a commercial resource. The extent of its present use is not a correct measure of its value. Some species are not now in much demand, but they possess properties which will give them a higher place in the future. On the other hand, some are passing down the scale from their former high position to minor places because of increasing scarcity. Instances of that kind should be carefully considered, and if an increase of supply seems practicable it ought to be encouraged. The extirpation of valuable species is not necessary in this country. The people of Massachusetts cut all their original white pine forests long ago, but they are growing young forests to take the place of the old. Other states can with profit follow the example of Massachusetts, each devoting its care to the forest trees which pay best.

YELLOW POPLAR—This is one of the finest trees of the American forest. It is generally considered the largest hardwood of this country and none exceed it in well-balanced proportion of trunk. The fertile valleys and slopes of Tennessee have furnished some of the largest poplars on record. Reference has already been made to the five-foot poplar trunks, felled in 1779 on the Holston River by Isaac Shelby, to be hewed into canoes to carry his army of 750 men down the river to attack the Indians who were assembling near Chattanooga to march against the Carolina frontiers. This tree has been the greatest canoe wood of America, next to the paper birch. In some regions the name canoe wood has been given it. A list of uses for which it has been found suitable would include almost every commodity of wood from the earliest settlement of this country to the present time. Only where great strength, hardness and toughness are essential is it unfitted.

The maximum annual cut of yellow poplar in this country seems to have been passed, and the future supply must come from a rather small region of which Tennessee, Kentucky and West Virginia are the center. More than half of the country's supply in 1910 came from those states, most from West Virginia, next from Tennessee, and third from Kentucky. Estimates have been made that the remaining yellow poplar on the stump in this country does not much exceed 6,000,000,000 feet, which will be exhausted in nine or ten years at the present rate of cutting. Definite conclusions and great weight should not be given estimates of this kind. While they are based on the best obtainable data, no one knows how much poplar remains in the forests, and most of the general estimates of this kind have proved too low when the time comes to check them by exact information. It is certain that most of this wood in the original forests of this country has been cut, and that no large amount remains. The yearly output must, for that reason, soon decline with no hope that it can ever again reach high figures; but some yellow poplar will reach the markets for a long time to come. It requires many years to grow a good sized tree as poplars are usually rated, though it is a rather fast grower. The long time required will stand in the way of extensive planting. People who set apart wood-lots will choose loblolly pine or some other fast grower. A further fact against planting the poplar is that it wants the richest soil. It had the richest slopes and coves when it had choice of the whole country. Farmers of the future will not give up their best land to any forest tree, but will plant food and provender crops there and put their wood lots on poor or rocky corners. That will give the yellow poplar no chance in competition with other less choice species in the forests of the future. If it is compelled to exist on thin soil it degenerates so quickly that it becomes a "white poplar." That is the name usually applied to a runt yellow poplar—a poor soil specimen. It has little or no heartwood, is hard and tough, and being nearly all sap, which is white, a quite common belief has developed that it is not the same species as yellow poplar. It is the same, however, for there is only one species of this tree in America, and one in China; and, in fact, both might be considered as one, though separated by ten thousand miles.

Though not exactly on the subject of wood uses in Tennessee, the evidence of geology is interesting, because it warrants the belief that the yellow poplar was growing in the Appalachian region covering Eastern Tennessee in the cretaceous age—a time so remote that no geologist will venture to measure it in years. The yellow poplar's peculiar notched leaf is among the fossils in the strata beyond the Mississippi, which rocks, it is believed, were laid down as sands in the sea which then covered the Mississippi Valley; and the sands, and doubtless the poplar leaves also, were carried from the Appalachian highlands to that sea by rivers which then flowed westward, as they still do. If that view is correct, the yellow poplar is one of the very oldest broad-leaf species on earth, having come down to us through almost measureless ages. The character of the rocks in which the fossil leaves are embedded indicates that the tree then grew in soil of great fertility, as it does today, and leads to the conclusion that the mountain regions of Eastern Tennessee had deep, rich soil at a time when the Gulf of Mexico extended at least as far north as Nebraska. A tree so ancient, so splendid and so vigorous does not deserve to perish by the hand of man in the very region where it has held its ground during millions of years. There are sentimental as well as sound business reasons why steps ought to be taken to perpetuate the yellow poplar in protected woodlots, since it cannot much longer hold its place as a wild tree of the forests.

DOGWOOD—In 1910 Tennessee led in saw mill output of dogwood. That for the whole country was 1,469,000 feet. This quantity is so small as to place dogwood among the minor species; yet in the saw mill reports dogwood is not given justice. The total is certainly too small. Tennessee alone last year manufactured more dogwood into shuttle blocks than the whole reported output of saw mills in the United States. The explanation is that most of the dogwood does not go through saw mills, but is shipped in rough blank form to the shuttle factories. The trees are small and logs one foot in diameter are unusual, and a length of a few feet is the average. Two species grow in Tennessee, flowering dogwood (Cornus florida) which is most common, and blue dogwood (Cornus alternifolia). It is doubtful if the latter is a commercial commodity in Tennessee.

SYCAMORE—Tennessee is the fourth state in the production of sycamore, it being exceeded by Indiana, Missouri and Arkansas. In 1910 the saw mill cut in Tennessee was 5,000,000 feet and the manufacturers reported less than three-quarters of a million feet. It is apparent that most of the state's output of this wood is taken by manufacturers not operating in Tennessee. Twenty-six states contribute to the saw mill supply, and, contrary to general belief, the total yearly output has not decreased in the past ten years, though it was not the same from year to year. In 1909 the cut of sycamore in the United States was twice as great as in 1899. For the most part it is a waste land tree, and it should be encouraged. It takes possession of gravel bars along rivers, steep banks of ponds and streams and land subject to frequent overflow. The best lumber comes from trees of moderate size, for the very large are usually hollow. Sometimes trunks of great dimensions are mere shells and of no value, though formerly they were made into gums for the barn and granary, and wheat and corn were stored in them in place of barrels. There is only one species of sycamore in the eastern part of the United States, but California and Arizona each has one.

PERSIMMON—The entire reported saw mill output of persimmon in the United States does not exceed one million feet, yet manufacturers in Tennessee alone used 680,000 feet. Many other states produce it, and the total cut must amount to several million feet. The same custom prevails with persimmon as with dogwood, that much is sold in the log or bolt, and the saw mills never handle it.

The wood goes to the shuttle factories or is made into golf heads. Statistics are too meager to determine whether the cut of this wood is increasing or diminishing; but complaint is made by shuttle people that they frequently find the wood hard to procure. They use the sapwood only, which is white, and in appearance somewhat resembles hickory. The persimmon tree is a good fighter in the contest for ground, and it spreads rapidly into open spaces. The seeds are widely dispersed, and a vigorous growth springs up from stoloniferous roots. It is not probable, therefore, that this valuable tree will disappear from Tennessee in the near future, but whether it will produce enough wood to meet demand is doubtful.

BLACK CHERRY—In the annual report of saw mill output by the Bureau of Census, black cherry is classed among the minor species, not because it is of small value, but that it is scarce. The whole reported cut in 1910 was a little over 18,000,000 feet, and Tennessee's part of it is not stated. Manufacturers in the state used less than half a million feet. The species grows slowly, and it is doubtful if much of it will ever be planted for use. A tolerably good imitation of this wood can be produced by staining red gum and tupelo; but the real luster, the characteristic tone, of cherry is due to the bright lining of the wood cells, and this has not yet been successfully imitated by staining any other wood.

BLACK WILLOW—This is one of the most rapid growing of Tennessee's native trees, and it is worth considering in plans of future forestry and conservation. The wood is plain and can never have a wide range of uses, but it is suitable for boxes and is worth growing for that purpose alone. A mud flat, too wet for cultivation, has been known to grow more than two thousand feet of lumber yearly per acre, for forty years. That is doubtless above the average growth of willow, but it shows the possibilities. Willow plants itself and cares for itself when ground is available. Tennessee has much wet land, too much subject to overflow to be profitable for field crops, and in such places willow ought to be encouraged. It protects the land against washing, collects sediment, gradually builds the surface higher and ultimately may convert it into dry land for farming. The wet situation in which willow grows affords protection against fire, and gives the young trees an advantage which is denied to many species on dry land. The willow produces a fence post or a small saw-log in a few years; and old trees two or more feet in diameter

are not unusual, and some attain three or four times that size.

SASSAFRAS—Probably the principal value of sassafras in the future will be for oil and not lumber. The oil is manufactured from the wood and bark, chiefly from the roots, and is used to perfume soap. It has long been so used, but of late years synthetic oils, of which one of the ingredients is camphor, have somewhat lessened the demand for sassafras oil. The whole reported output of sassafras lumber in 1909, according to census returns, was only 24,000 feet, and yet Tennessee alone last year used fourteen times that much in its factories. If the wood were more abundant, it would be a valuable commodity, for it is of good color, attractive grain, and is hard, strong and durable. Its tendency to season without checking was recognized generations ago by early settlers who for that reason selected it for dugout canoes on the Mississippi River and elsewhere. It is of historical interest that sassafras was once (for a brief period) the most valuable wood in the United States, due to a belief that it was a cure-all for diseases. Sassafras is in no danger of becoming extinct. It spreads so rapidly into open ground that in some localities it becomes a nuisance; but large trees, suitable for lumber, are apt to become scarcer than they now are.

BUCKEYE—This wood is of considerable importance in Tennessee and manufacturers last year used nearly 3,000,000 feet of it, which was almost one-fourth of the entire cut of the wood in the United States. Three species of buckeye are cut in Tennessee, Ohio buckeye (Aesculus glabra), yellow buckeye (Aesculus octandra), and purple buckeye (Aesculus octandra hybrida). The yellow buckeye is most abundant and of largest size. The box-makers, trunkmakers and coffin manufacturers used nearly all the buckeye reported in Tennessee, and practically all of it was state grown. It is especially valued by manufacturers of candies and chocolates. The seasoned wood is white, clean and odorless, and when made into boxes imports no taint to articles of food. When green it is one of the softest woods, but it hardens and toughens as it becomes dry. It is among the lightest of the broad leaf trees, lighter even than basswood, which in some respects it closely resembles.

MAHOGANY—This is a foreign wood and comes from Mexico, the West Indies and other parts of tropical America. Other woods commercially known as mahogany are brought from Africa. Next to osage orange, mahogany is the most costly wood reported by manufacturers in Tennessee. Sixty thousand of the 183,000 feet reported was the African species (Khaya senegalensis).

CHESTNUT—Tennessee ranked fifth among the chestnut producing states in 1909, with a cut of 58,000,000 feet. That was four times as much as its factories worked into commodities, and it shows that the state is sending most of its chestnut beyond its borders. In fact, nearly two-thirds of what was used in the state was imported. Home-grown chestnut was sold out of the state, while Tennessee factories were sending away from home for what they needed. Chestnut is perhaps the most important wood of this country for coffins and caskets, and it goes to large cities where these commodities are manufactured on an extensive scale. The owners of chestnut timber are concerned lest a blight affecting the species in some of the Northeastern States shall spread into other regions.

OSAGE ORANGE—Only 8,000 feet of the wood was used last year in Tennessee, but it cost more per thousand than any other. It came wholly from Texas and Oklahoma, which is its natural range. It has been planted for hedges and ornament in nearly every state, and is known by many names. In Tennessee some call it osage apple tree, and others yellow wood. The last is the proper name of another Tennessee wood (Cledrastis lutea), which is not closely related to the osage orange. Manufacturers of wagons use all the osage reported. It is a very hard wood and shrinks and swells little under climatic changes. The very high price is accounted for by the fact that it was already manufactured into felloes when received at the wagon factories.

BASSWOOD—Tennessee finished 8,500,000 feet of basswood in 1910. That was three million feet under the reported output of the preceding year. There has been a general decline during the past five years in the cut of this wood in the United States. In Tennessee it is occasionally called linn and black limetree. Two or more species are cut in the state, but they are considered one by most lumbermen. The white basswood (Tillia heterophylla) is often known in Tennessee as large-leaved limetree, or linn.

CUCUMBER—This wood resembles basswood, but if leaves and fruit are observed, it is not likely to be mistaken for basswood or any other tree. It is scarce and not very important. In early times it was much sought for by pioneers who hewed dough trays and woodenware from solid blocks but that use has passed away and it now goes to mills to be made into doors and other mill work. The tree is conspicuous in the forest after the first severe frost in the autumn, for the leaves take on strange and mottled colors and all come down within a day or two. As they lie on the ground they resemble, in color, a heap of owl feathers. This may be classed as one of the trees that will disappear with the cutting of the original forests; for no one will plant it except as a curiosity and a relic in parks. It is named for its fruit, two or three inches long. When green, the fruit resembles a stunted, misshapen cucumber, but when ripe it is bright scarlet. It yields abundance of seeds and ought to reproduce vigorously, but it does not appear to do so. Trees are found only here and there scatered through forests of other woods.

BEECH—Tennessee produces three times as much beech as its factories use. Only one species of beech grows in the United States, except in parks where others have been planted. A tree bearing some resemblance to it is known as blue beech (Carpinus caroliniana). Though the blue beech was not reported by any manufacturer in Tennessee, it is probably used in a small way for handles and for other purposes. The common beech has been classed as a food tree for centuries; and in some parts of this country the nuts constitute an article of diet, but in Tennessee they are valuable only as mast for hogs.

Planing Mill Products.

This is the largest wood-using industry in Tennessee, and the chief commodities manufactured are flooring, ceiling and siding. These products are made and are offered for sale in the general market, it not being essential that they be of special sizes and patterns. The planing machines which turn them out are generally adjuncts of the saw mills that cut the lumber. Red oak, which doubtless includes a number of species under that name, heads, for quantity, the list of thirty-one species. The rather large amount of black walnut in this industry is unexpected, since the wood is never used as siding and seldom as flooring except for parquetry which is not included in Table 2. Black walnut's low price may be accounted for by assuming that the material was purchased in the log. The cost of white pine is lower than would be expected for grades acceptable at a planing mill. The Massachusetts box-makers pay that much for what passes through their hands. Mahogany's price is rather low, but the prevailing grades may account for it. Thirty-one species in all is a good showing when it is considered that twenty-nine of them grow in Tennessee, though no part of the cypress and sassafras in the table was procured in the state.

Packing Boxes and Crates.

This is the second largest wood-using industry in Tennessee. In some other states it is the largest. Since this product is employed in shipping merchandise and the commodities of truck patch and garden to market, the quantity of such boxes and crates made in a state is a fair index to the state's position as a manufacturing district. Tennessee ranks high, though not as high as some of the states north of it. This business in Kentucky demands 109,000,000 feet of lumber, Wisconsin 119,000,000, Maryland 136,000,000, and Illinois 372,000,000. No satisfactory reason has been found why Tennessee with its abundance of cheap wood should pay a higher average price for box material than is paid by any of the states named. Box-makers in Wisconsin buy theirs for $13.09, in Maryland for $13.31, in Illinois for $15.31, in Kentucky for $15.36, while in Tennessee the average for the whole state is $16.26. Cottonwood is Tennessee's leading box material, and it is high in price. It possesses almost every requisite for a good box. It is strong, tough, hard to split, holds nails well, has no disagreeable odor or colored sap that will stain the contents. It is white in color, which is a quality greatly desired by certain shippers who wish to stencil their advertisements on the packages. The wood suits so many other purposes that box-makers must bid high for it or it will not come to them. That they get it in spite of cost and in amounts larger than any other wood, is the best evidence that it is looked upon as the box material par excellence of Tennessee.

Red gum, yellow poplar and shortleaf pine are extensively demanded for boxes and possess most of the essential features required. Medium weight is one requisite that should not be overlooked. Though a few pounds more for a single box might be a small thing to consider, it is not small if hundreds or thousands of boxes are shipped by freight, and the weight would be still more important were shipments to go by express. Buckeye and basswood, both present in large amounts in Table 3, are light in weight. They are likewise light in color which puts them, as far as stenciling qualities are concerned, in the class with cottonwood. It is worthy of note that these two woods which are nearest to cottonwood in color are nearest to it in cost. Except cottonwood, they are the costliest in Table 3.

PLANING MILL PRODUCTS.
Table 2.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Red oak	30,399,000	20.65	$24.88	$ 756,200	22,133,000	8,266,000
White oak	27,887,825	18.94	24.27	676,939	23,022,000	4,865,825
Yellow poplar	25,470,825	17.30	24.08	613,287	22,620,000	2,850,825
Shortleaf pine	16,404,000	11.14	17.41	285,629	10,819,000	5,585,000
Red gum	12,500,000	8.49	12.92	161,491	7,536,000	4,964,000
Longleaf pine	9,154,000	6.22	20.97	191,932	.....	9,154,000
Chestnut	5,681,825	3.86	27.59	156,771	993,000	4,688,825
Beech	4,543,000	3.09	18.12	82,337	1,843,000	2,700,000
White ash	2,918,000	1.98	18.71	54,600	2,148,000	770,000
Basswood	2,426,825	1.65	18.87	45,788	2,113,000	313,825
Cottonwood	2,000,000	1.36	17.50	35,000	1,000,000	1,000,000
Cypress	1,880,000	1.28	27.47	51,650	.....	1,880,000
Sugar maple	1,500,000	1.02	19.97	29,950	1,125,000	375,000
Birch	915,000	.62	37.60	34,400	170,000	745,000
White pine	478,825	.32	16.53	7,914	365,000	113,825
Black walnut	388,000	.26	20.43	7,926	55,000	333,000
Cherry	376,000	.26	20.00	7,520	43,000	333,000
Sassafras	333,000	.23	20.00	6,660	.....	333,000
Sycamore	282,000	.19	13.67	3,854	157,000	125,000
Silver maple	275,000	.19	12.78	3,515	150,000	125,000
Black willow	250,000	.17	12.50	3,125	125,000	125,000
Hackberry	250,000	.17	12.50	3,125	125,000	125,000
Buckeye	243,000	.16	13.72	3,335	243,000	.....
Hemlock	223,825	.15	9.43	2,111	110,000	113,825
Tupelo	130,000	.09	24.23	3,150	80,000	50,000
Yellow oak	100,000	.07	15.00	1,500	100,000	.....
Mahogany	100,000	.07	116.00	11,600	.....	100,000
Butternut	42,000	.03	18.95	796	42,000	.....
White elm	30,000	.02	16.33	490	30,000	.....
Black gum	18,000	.01	12.72	229	18,000	.....
Black ash	15,000	.01	12.00	180	15,000	.....
Totals	147,214,950	100.00	$22.03	$3,243,004	97,180,000	50,034,950

BOXES AND CRATES, PACKING.
Table 3.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Cottonwood	22,550,000	28.92	$21.99	$ 495,900	12,550,000	10,000,000
Red gum	16,743,000	21.47	12.92	216,243	15,543,000	1,200,000
Yellow poplar	16,186,510	20.76	15.23	246,444	15,286,510	900,000
Shortleaf pine	13,158,820	16.87	12.45	163,773	4,658,820	8,500,000
Buckeye	2,116,617	2.71	17.29	36,590	2,116,617	.....
Basswood	1,796,470	2.30	17.35	31,163	1,796,470	.....
Chestnut	1,030,000	1.32	15.02	15,471	1,000,000	30,000
White pine	934,785	1.20	16.11	15,064	934,785	.....
White oak	925,000	1.19	16.83	15,570	925,000	.....
Black gum	865,000	1.11	9.69	8,380	865,000	.....
Beech	490,000	.63	15.21	7,455	490,000	.....
Sugar maple	210,000	.27	15.00	3,150	210,000	.....
Silver maple	198,000	.25	13.33	2,640	198,000	.....
Cucumber tree	125,000	.16	10.00	1,250	125,000	.....
White elm	125,000	.16	14.88	1,860	125,000	.....
Sycamore	117,000	.15	11.65	1,363	113,000	4,000
Slippery elm	115,000	.15	15.19	1,747	115,000	.....
Shittimwood	91,308	.12	14.11	1,288	91,308	.....
White ash	88,000	.11	13.00	1,144	14,000	74,000
Butternut	52,000	.07	9.00	468	52,000	.....
Table mountain pine	30,000	.04	12.00	360	30,000	.....
Yellow oak	20,000	.03	12.00	240	20,000	.....
Tupelo	6,000	*	12.00	72	6,000	.....
River birch	6,000	*	12.00	72	6,000	.....
Totals	77,979,510	100.00	$16.26	$1,267,707	57,271,510	20,708,000

*Less than 1-100 of 1 per cent.

The oaks are seldom used for boxes, except where extra strength is wanted, and weight is of minor consideration. It is true that nearly a million feet of white and yellow oak are listed in the table, but most of it was crates. Oak's strength creates a demand for it; but it is heavy and it nails poorly. A study of each wood separately in the table would probably fail to show reasons why all are there, except that some are cheap and convenient, but others have special properties which give them a place whether they are convenient or not.

About one-fourth of the box material comes from other states, and cottonwood is imported in largest amounts and shortleaf pine next. No wood comes wholly from other states, and that which is brought in comes solely because it is more convenient to procure it there than in Tennessee. Most of the imports come from Arkansas and Missouri.

Furniture.

The manufacturers of Tennessee have entered into the furniture business in a serious way. They are competing successfully with all comers and their product reaches markets far from the places of manufacture. The state is still below North Carolina in the total quantity made, but it produces nearly three times as much as Kentucky. The abundance of good furniture material in the forests of the state, and in those within reach, give advantages which the Tennessee manufacturers are making the most of. They procure about two-thirds of their furniture wood in the state, and it costs them on an average $22.34 per thousand feet. North Carolina furniture makers buy their raw material cheaper than that ($18.23), but most other states pay more—Massachusetts, $28.36; Illinois, $39.09; Maryland, $29.32; Wisconsin, $25.22, and Kentucky, $30.73. More than nine-tenths of Tennessee's furniture material shown in Table 4 is hardwood. The number of species used is large, and only two, longleaf and mahogany, come wholly from without the state, and mahogany is the only foreign wood in the table. The extraordinarily high cost of this wood was doubtless due to the small amount purchased and its high grade. Mahogany lumber usually costs about half the figure given in the table, but sometimes double or threefold that for extra fine figured wood.

A rather large quantity of red cedar is listed in Table 4. This wood has been used for furniture in this country since the first settlements on the Virginia coast. Some of the earliest records speak of the odor of the wood and of the favor in which it was held on that account. One of the important uses for it has always been for clothes chests and wardrobes. The belief has long prevailed that its odor drives moths and other insects away from clothing and prevents injury from that source. Large numbers of clothes chests are still sold every year to persons who believe the odor is offensive to insects. It is not known that any carefully conducted investigation has been made to determine red cedar's value in that respect. The most that can be said for it is that for three hundred years the belief has been common among people acquainted with the wood that clothes stored in cedar boxes and wardrobes are immune from insect attacks. Some of the Western cedars, particularly Port Orford and incense cedar, have the same reputation, and sassafras is not much behind them in reputed efficiency. It does not appear that any sassafras was used for furniture last year in Tennessee. It was once highly esteemed for bedsteads because of the belief that it contributed to the soundness of sleep by keeping troublesome nocturnal insects away.

FURNITURE.
Table 4.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Red gum	13,510,000	34.40	$14.55	$ 196,595	6,000,000	7,510,000
White oak	12,044,000	30.67	29.92	360,375	9,385,000	2,659,000
Red oak	9,143,000	23.28	24.03	219,720	7,243,000	1,900,000
Yellow poplar	1,037,000	2.64	25.25	26,184	1,017,000	20,000
White ash	655,000	1.67	24.27	15,895	280,000	375,000
Longleaf pine	650,000	1.66	18.77	12,200	.....	650,000
Shortleaf pine	610,000	1.55	16.61	10,130	310,000	300,000
Sugar maple	474,000	1.21	25.19	11,939	474,000	.....
Chestnut	269,000	.68	13.57	3,651	269,000	.....
Cottonwood	150,000	.38	25.00	3,750	50,000	100,000
Basswood	107,000	.27	24.60	2,632	107,000	.....
Tupelo	101,000	.26	19.97	2,017	1,000	100,000
Largetooth aspen	100,000	.25	25.00	2,500	100,000	.....
White elm	92,000	.23	18.05	1,661	62,000	30,000
Red cedar	80,000	.20	36.88	2,950	80,000	.....
Buckeye	50,000	.13	20.00	1,000	50,000	.....
Black gum	50,000	.13	15.00	750	50,000	.....
Yellow oak	50,000	.13	16.00	800	50,000	.....
Beech	25,000	.06	18.48	462	25,000	.....
Hickory	20,000	.05	19.50	390	20,000	.....
Birch	20,000	.05	18.00	360	20,000	.....
Black walnut	15,000	.04	36.67	550	15,000	.....
Sycamore	10,000	.03	16.00	160	10,000	.....
Cherry	10,000	.03	40.00	400	10,000	.....
Mahogany	500	*	300.00	150	.....	500
Totals	39,272,500	100.00	$22.34	$ 877,221	25,628,000	13,644,500

*Less than 1-100 of 1 per cent.

Sash, Doors, Blinds and General Millwork.

The articles manufactured from woods listed in Table 5 are too many to be enumerated separately, but they belong to groups and are shown in that way. It seldom happens that one factory makes all of them. It may devote all its energies to doors, and probably to a single grade or class of doors. Many kinds and patterns of sash are demanded by the building trades, and an establishment may turn out but one or two kinds. Millwork is so broad a term that it covers a miscellaneous group of commodities that cannot be designated by any name more appropriate. Among the principal things included may be named stairwork, including balusters, railing, steps and newel posts; interior trim or finish, consisting in part of picture molding, baseboards, chair boards, panels, brackets, capitals, ornaments and shelving in niches and cubbyholes; porch columns and railing with spindles and lattice work, and many other kinds of dressed building material. The differences between the output represented in Table 5 and that classed as planing mill products and included in Table 2 are clear enough in general outline, but in details there must be more or less overlapping. The flooring, ceiling and siding of Table 2 is made according to general patterns, and is not usually manufactured for particular persons or markets; while much of the class of millwork belonging in Table 5 is made to order. A man may want finish of a special kind, wood or design for a house and gives the order for it, and the mill turns it out. A stair of unusual design or a portico, hallway, or suite of rooms requires millwork out of the ordinary, and such cannot be bought in the open market and must be made to order. General planing mills which produce flooring, siding and ceiling are usually, though not always, run in connection with a saw mill. The door and sash factory is not, but procures its raw material in the open market or has it sawed under contract. The machine in a plant of that kind must be designed for a greater variety of work than the simple ones in a planing mill which make only a few staple articles.

SASH, DOORS, BLINDS, AND GENERAL MILLWORK.
Table 5.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Shortleaf pine	15,208,500	39.80	$17.88	$ 271,906	4,886,500	10,322,000
Chestnut	4,410,000	11.54	35.06	154,600	1,360,000	3,050,000
Cypress	3,635,000	9.51	33.42	121,465	.....	3,635,000
Yellow poplar	3,601,500	9.42	30.28	109,055	2,851,500	750,000
White oak	3,216,500	8.42	25.78	82,936	2,617,500	599,000
Longleaf pine	3,049,000	7.98	16.35	49,862	.....	3,049,000
Red oak	2,881,500	7.54	21.66	62,425	1,956,500	925,000
Basswood	660,000	1.73	25.68	16,950	285,000	375,000
White ash	605,000	1.58	31.74	19,200	230,000	375,000
Shittimwood	200,000	.52	19.00	3,800	200,000	.....
Birch	198,000	.52	31.06	6,150	98,000	100,000
Red gum	161,000	.42	17.86	2,875	161,000	.....
Sycamore	100,000	.26	15.00	1,500	100,000	.....
Black walnut	68,000	.18	39.49	2,685	8,000	60,000
Cherry	67,000	.18	53.21	3,565	17,000	50,000
Beech	60,000	.16	14.83	890	60,000	.....
Chestnut oak	50,000	.13	15.00	750	50,000	.....
Red cedar	20,000	.05	33.75	675	20,000	.....
White pine	10,000	.03	20.00	200	10,000	.....
White elm	10,000	.02	14.00	140	10,000	.....
Sassafras	3,000	*	24.67	74	3,000	.....
Mahogany	2,500	*	188.00	470	.....	2,500
Totals	38,216,500	100.00	$23.87	$ 912,173	14,924,000	23,292,500

*Less than 1-100 of 1 per cent.

Shortleaf pine leads all others by long odds in millwork and constitutes nearly 40 per cent of all, though twenty-two woods are in use. Ten of the 15,000,000 feet are imported, chiefly from Arkansas and Missouri. It comes from that region because it is convenient. Some preference is shown the pine from those states because it is of excellent quality. The wood is white, soft and of good figure. Most of it goes to manufacturers in Western Tennessee because of their proximity to the source of supply; while the eastern part of the state depends on home-grown shortleaf, or procures it from states further south.

Kentucky, Virginia and North Carolina grow most of the chestnut used in Tennesse and shown in Table 5. The state forests meet about one-third of the demand, yet Tennessee is not surpassed by any state in the annual cut of chestnut or in the quality. The average high cost of the wood is proof that grades are high. Cypress came wholly from outside the state and was cheaper than chestnut. Red gum does not occupy a high place to judge by the small quantity and the low price. It is in less demand for interior finish in Tennessee, where it grows abundantly, than in states farther north where it does not grow at all. As much red gum is made into interior finish in Wisconsin as in Tennessee, and it costs nearly $4 a thousand more there. Illinois manufacturers bought twenty times as much and paid $30.13 for it. The use of only 20,000 feet of red cedar for interior finish in Tennessee emphasizes the great change in the use of this wood for houses in that region. It has been said that half of the pioneer cabins of Tennessee were of red cedar, but that estimate probably applied to certain regions only. The whole quantity employed in house building last year in Tennessee, as shown by data compiled for this report, was hardly enough to make one modest cottage.

White pine's place seems very insignificant in this industry, only 10,000 feet, or about what a small factory can work up in a day. It is among the best woods in this country for sash, doors and blinds; and its cost as shown in the table does not indicate that high price cut it out. Millions of feet of chestnut, cypress and yellow poplar were bought at higher prices. It would not seem that door and sash manufacturers in Tennessee are getting the most out of their opportunities as long as they fail to make a specialty of white pine in producing their commodities. The saw mills of Tennessee turned out 39,000,000 feet of white pine lumber in 1910, and a little more than one foot to 4,000 found its way to the door and blind factories which ought to have had a large part of it.

Vehicles and Vehicle Parts.

This industry is large in the aggregate, but it is made up of many small shops in all parts of the state and a few large factories. Almost every village has a shop which makes or repairs wagons though the number of such vehicles in a year is small for each. In collecting statistics for this report it was not practicable to include all blacksmith shops in rural districts, though some of them occasionally make or mend vehicles, but the larger shops and factories were included. Constant care was necessary to avoid counting the same material more than once. Vehicle making is peculiar in that some of the wood passes through two or more factories before it appears in finished form. One may rough-turn the spokes, and another finish them; hubs may be partly made in one factory and completed in another. The same comment applies to different parts of vehicles, both wagons and buggies. Carriage bodies may be made in a shop which turns out bodies only. Sometimes parts made in various places are assembled by a factory, and a complete vehicle is turned out, though the work was done in several places. Conditions like these do not exist in many industries, and vehicle making is peculiar in that respect. Hickory is the most important wood in the quantity used, but several others are higher in cost. The most costly is osage orange, which is used for farm wagon felloes. The price is figured on the finished pieces, ready for use, after all work has been done and all waste eliminated. Wagons with felloes of that wood give best service on sandy roads in dry regions. For very strong, large felloes beech is preferred to nearly all other woods. Yellow poplar, which is third highest in price in this industry, is made into carriage bodies. It finishes very well, takes high polish, and it holds paint. The small lot of black walnut was made into fine carriage finish.

Car Construction.

Nine woods make up the material employed in car construction and repair in Tennessee, according to Table 7. The number of woods is small, but the total quantity of lumber is fairly large. The car factories of Illinois reported the use of thirty-three woods, and a total amount of 407,333,000 feet, at an average cost of $30.44 a thousand.

VEHICLES AND VEHICLE PARTS.
Table 6.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Hickory	19,760,200	59.00	$23.94	$ 473,112	18,479,200	1,281,000
White oak	10,504,800	31.36	26.19	275,097	9,084,800	1,420,000
Red oak	777,000	2.32	31.33	24,345	452,000	325,000
Red gum	718,000	2.14	25.15	18,059	164,000	554,000
White ash	648,000	1.93	18.12	11,739	427,000	221,000
Longleaf pine	487,000	1.45	20.05	9,762	.....	487,000
Yellow poplar	481,000	1.44	43.07	20,715	321,000	160,000
Beech	77,000	.23	20.52	1,580	2,000	75,000
Shortleaf pine	20,000	.06	18.00	360	20,000	.....
Osage orange	8,000	.02	200.00	1,600	.....	8,000
Basswood	5,500	.02	31.09	171	5,500	.....
White pine	5,000	.02	28.00	140	5,000	.....
Black walnut	1,000	*	175.00	175	.....	1,000
Totals	33,492,500	100.00	$24.99	$ 836,855	28,960,500	4,532,000

*Less than 1-100 of 1 per cent.

Tennessee's nine woods aggregate 14,164,918 feet at an average cost of $19.41 a thousand. Illinois is the leading state in this country in car manufacture, and the comparison with Tennessee may be of interest. Car makers in Tennessee pay little more than half as much per thousand as is paid in Illinois; but the important difference should be recognized, that in Illinois a number of expensive foreign woods are used in large amounts, while Tennessee builders used no foreign material. The proportion of high-grade work, such as sleeping and dining cars, is higher in Illinois than in Tennessee, where mining cars constitute a leading item. Cars of that kind operate underground to bring coal to the surface, or on switches and top lines in bringing coal and ore to the standard railroads.

Seventy-seven per cent of all the wood entering the car shops in Tennessee is longleaf and shortleaf pine, and the proportion of these two species in Illinois is 62 per cent. Longleaf pine in the latter state costs $29.28, and shortleaf $27.52, while in Tennessee they cost, respectively, $21.32 and $18. In matter of cost the advantage is with Tennessee. Yellow poplar costs Illinois manufacturers $51.59, and Tennessee $42.12. This is a valuable material and is one of the best for interior car finish, and Tennessee has the advantage over Illinois. Other comparisons might be made, and in almost every instance concerning the cost of wood the advantage is with Tennessee. Nevertheless, conclusions should not be drawn from that showing alone, for the grades used may not be the same. It is none the less evident that Tennessee possesses the resources and occupies the geographical position to warrant a trial at making it one of the greatest car building centers of the country. The industry is not yet developed to compare with Illinois, but the field is ready for development. It has the wood, coal, iron and the water power. The latter has not yet been much thought of, but its development is destined to become one of the surprises which the future has in store. The water power is in the mountains of the east where the rivers pour down steep channels. It will last forever if the forests are protected against fire so that stream flow may be regular and not subject to alternate destructive floods and withering drought.

Car manufacture is only one of many industries which may become great in years to come if resources are wisely husbanded. Five oaks appear in the list of material in Table 7. That many more might be included, for they are obtainable.

CAR CONSTRUCTION.
Table 7.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Longleaf pine	5,755,096	40.63	$21.32	$ 122,708	.....	5,755,096
Shortleaf pine	5,163,925	36.46	18.00	92,952	.....	5,163,925
White oak	2,402,662	16.96	18.65	44,814	2,360,662	42,000
Red oak	400,000	2.82	16.25	6,500	250,000	150,000
Texan oak	211,056	1.49	18.49	3,903	.....	211,056
Chestnut oak	200,000	1.41	16.00	3,200	200,000	.....
Bur oak	16,132	.12	20.02	323	16,132	.....
Yellow poplar	11,300	.08	42.12	476	11,300	.....
Cottonwood	4,747	.03	20.64	98	.....	4,747
Totals	14,164,918	100.00	$19.41	$ 274,974	2,838,094	11,326,824

Handles.

Almost 90 per cent of the handles made in Tennessee are of hickory, several species being included under that name and not distinguished in trade, though they may be when trees yet stand in the forest. This is the best known material in the world for two important classes of wares—light vehicles and handles. It has been said with much truth that the hickory handles sell American hammers the world over. Substitutes for hickory have been sought in all markets of civilized countries; and the little known forests of barbarous islands and remote mountains have been ransacked in the search, but no satisfactory substitute has yet come to light. There is a rare toughness and elasticity in hickory which nature has denied to all other known woods. Some are stronger, many are harder, but the rare quality is lacking in all of them, and the fact has come to be generally recognized, so that the handle sells the hammer.

Hammers are not the only tools with handles. Axes are almost as important, but the handle is more frequently sold separately than in the case of hammers. There is a recognized difference in value between hickories, not so much between species as in parts of the same tree. Some buyers, with special purposes in view, buy the butts of medium-sized trees and use only the white sapwood. The tops, which by some are considered more brash, and the red heartwood of the butts are disposed of to other buyers. As much of this discrimination may be based on sentiment and tradition as on characteristics of the wood. The red heartwood is more used now than formerly. Much of it goes into pick handles, which demand strength more than resiliency.

HANDLES.
Table 8.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Hickory	8,623,776	88.69	$22.80	$ 196,586	7,361,276	1,262,500
White oak	650,000	6.68	29.23	19,000	650,000	.....
Red gum	350,000	3.60	10.00	3,500	350,000	.....
White ash	100,000	1.03	10.00	1,000	100,000	.....
Totals	9,723,776	100.00	$22.63	$ 220,086	8,461,276	1,262,500

Though hickory far surpasses all other woods in Table 8, it is not the only one. A small quantity of white oak competes with hickory for handles. Some assert that by boiling the oak handle in oil it is rendered much tougher than when in its natural state; but further experiments and additional reports seem necessary to establish that claim. The ash listed in the table represents handles for hoes, rakes, shovels and pitchforks. Strength and stiffness fit that wood for the place it occupies as the most important handle material for agricultural tools. Red gum occurs in this table. It is made into certain tool handles and into a class known as D-handles, because the shape suggests that letter. Such handles are equipped with a wire for fastening them to such packages as tailors, milliners and other trades people deliver to their customers. The very low cost of the gum and ash in this industry indicates that purchases were made in log form.

CASKETS AND COFFINS.
Table 9.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Chestnut	1,772,730	18.67	$13.94	$ 24,716	725,000	1,047,730
Shortleaf pine	1,600,000	16.85	12.97	20,750	1,250,000	350,000
Yellow poplar	1,548,685	16.31	22.63	35,043	1,060,000	488,685
Red gum	1,514,800	15.96	14.96	22,668	5,000	1,509,800
Cypress	1,014,339	10.68	15.96	16,186	.....	1,014,339
White pine	820,000	8.64	16.01	13,125	795,000	25,000
Basswood	508,038	5.35	20.82	10,576	350,000	158,038
Hemlock	300,000	3.16	12.00	3,600	.....	300,000
Buckeye	200,000	2.11	18.00	3,600	200,000	.....
Red oak	100,000	1.05	18.00	1,800	100,000	.....
Red cedar	95,493	1.01	42.01	4,012	95,493	.....
Black walnut	20,000	.21	45.00	900	20,000	.....
Totals	9,494,085	100.00	$16.53	$ 156,976	4,600,493	4,893,592

Caskets and Coffins.

The average cost of material used for coffins and caskets in Tennessee is low. The cost of the wood employed varies greatly in different parts of the country, and customs vary as to the kinds of wood used. In Louisiana more mahogany is reported than any other wood, while in Tennessee no mahogany is listed. In most regions in the eastern half of the United States chestnut is prominent as a material for caskets, coffins and burial boxes. The latter are the rough boxes enclosing the caskets. Manufacturers assign no special reason why chestnut should hold so prominent a place, except that custom demands it, and the demand is met. In most instances the grade of chestnut known to the trade as "sound wormy" is unobjectionable. Such wood has been perforated by small boring insects whose galleries are about the size of large pin holes, but otherwise the wood is sound. In the finished work these holes are not usually visible. Sometimes casket manufacturers use wormy mahogany in the same way. The holes in the mahogany are made by teredoes while the logs are floating in brackish water; but the perforating of the chestnut is done on land. In Tennessee the cost of the chestnut reported in this industry was low, there being only two beneath it in the list of twelve woods. The average cost of all the woods may be compared with similar figures in certain other states, as follows:

North Carolina	$17.09
Missouri	19.99
Wisconsin	24.42
Illinois	26.60
Kentucky	40.19

The Kentucky average is greatly raised above what it otherwise would have been because considerable quantity of very high-priced black walnut was used and a larger quantity of white pine. The Kentucky coffin makers paid $50 for yellow poplar, the Tennessee makers paid only $22.63; chestnut in Kentucky cost $20, in Tennessee $13.94; red cedar $40 in Kentucky, and $45 in Tennessee; oak $44.07 in Kentucky, and $18 in Tennessee; white pine $24 in Kentucky, and $16.01 in Tennessee. The striking differences in most of these prices, with only a state line separating the two regions, should be attributed to grades more than to anything else. It is impossible that so much difference can be due to freight rates. Some manufacturers specialize on high-class commodities and buy expensive wood; others cater to a different trade, and their raw material costs less. The rough shipping boxes are included as one of the commodities of the casket and coffin industry, and most of the cheap lumber is used in their manufacture. In Tennessee some of the red cedar, which is next to the highest priced wood in the industry list, is made into outer boxes because it is a long-lasting wood. Another reason for the use of cedar for burial boxes is that custom so long demanded them when the wood was abundant and cheap that the demand continues though red celar is now scarce. With pencil makers paying $7.50 per ton for cedar logs, the casket makers must pay a correspondingly high price to procure this wood for burial boxes.

Chairs.

The reason for treating the manufacture of chairs separate from furniture is that the makers of chairs frequently confine their operations to that branch of the furniture business. Wood for chair making is usually cheaper than that demanded by manufacturers of other furniture. The same kinds of wood are used by both, but chair material is in smaller pieces, permitting of a closer utilization of waste through the workng up of scraps. In some localities there are mills which saw nothing but chair material. Small and crooked logs are acceptable, and can be used for dimension stock down to one inch square and a foot or more in length. A general furniture factory could make small use of such material. There are standard sizes for chair stock, such as rounds, backs, seats, legs, but other kinds of furniture are made in such various patterns, and the fashions and styles change so often, that standards in sawed stock are not often practicable. Red oak is the principal chair wood in Tennessee as shown in Table 10. This wood, as was explained in a preceding paragraph of this report, is not a single species, but includes several oaks under one name. The chair stock mill makes a pretty clean sweep of the various oaks on a tract of land where it is operating, and after culling out some of the white oaks, the rest goes in as red oak.

The white oak may not be culled out, but all may go to the chair factory. Table 10 shows a remarkably even run of average costs of the different kinds of wood. The highest is $15.53, the lowest $10, and the average $15.01. The quantity of sawdust and shavings in a chair factory is large because much

of the material is reduced to small dimensions; but considering the unpromising character of the bulk of the logs that go to the mills, and the large proportion of small pieces worked out, the waste at a chair factory is small.

CHAIRS.
Table 10.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Red oak	4,901,000	72.53	$15.53	$ 76,110	2,901,000	2,000,000
White oak	1,100,000	16.28	14.55	16,000	1,100,000	.....
Sugar maple	400,000	5.92	12.38	4,950	400,000	.....
Hickory	130,000	1.92	12.62	1,640	130,000	.....
Beech	125,000	1.85	12.30	1,538	125,000	.....
Birch	100,000	1.48	12.00	1,200	.....	100,000
Red gum	1,000	.02	10.00	10	1,000	.....
Totals	6,757,000	100.00	$15.01	$ 101,448	4,657,000	2,100,000

Pencil Stock.

Table 11 lists two woods for lead pencil stock in Tennessee—red and white cedar. Though reported in that way, it is probable that only red cedar is used, and what is called white cedar is the white sapwood of red cedar. The white cedar or arbor vitae in the mountains of Eastern Tennessee is a different species. The average cost of pencil cedar as shown in the table is misleading unless explained. It might seem unreasonable that cedar suitable for pencils should be purchased for $8.30 a thousand feet, when other manufacturers pay $25 and $30 for what they convert into furniture. The difference in cost is due to the different forms in which the stock is purchased. The furniture people buy theirs as sawed lumber, after the slabs and sawdust have been removed; but the pencil wood is bought with all the waste. Not only are logs purchased, but also old stumps, fence rails, gate posts, barn logs, bridge cribs and cedar in all shapes, sizes and conditions, some of it half rotten, other wheather checked, and all piled together, loaded on cars and sold by weight to the makers of pencil slats. This is the material which costs $8.30 per 1,000 feet, when the weight has been reduced to board feet. It is evident that most of the collection of all cedar wood thus brought together is waste. By the time the slat maker has worked out such of it as he can use, he has thrown away perhaps four-fifths of all he bought. Though the mass of wood in the rough may have cost him $8.30 per 1,000 feet, the slats will cost several times that much if estimated by the thousand feet. The factory which reduces the rough material to slats does not make the finished lead pencils. Other factories, some in New York, New Jersey or other states, and some in Europe, buy the slats and convert them into pencils ready for use. The slats are one-quarter of an inch thick, seven inches long and two and one-half inches in width. A slat of that kind makes six half pencils. Formerly when cedar was abundant pencil makers bought wide slats only; but cedar that can be worked into wide slats is becoming so scarce that narrow stock now finds ready sale. Other woods have been tried for pencils, and some have been fairly successful, particularly for the cheap grades; but the unremitting search that still goes on for red cedar is proof that no available and wholly satisfactory substitute has been found. Several qualities are demanded of a pencil wood. It must be soft and must whittle easily. To meet that requirement, it must be brittle so that the shavings will fall away as the knife cuts. The wood must be moderately light to keep transportation charges down when shipments are large or go long distances. It must be moderately dark in color, such as will not soil easily in handling. The wood must have a pleasing odor when freshly cut. It must not be cross-grained, for that lessens its good whittling qualities. Some of these qualities seem trifling, yet the buying public has learned to expect them in a pencil and is disappointed if any one of them is absent. The extensve search for substitutes among the many woods of this and other countries has demonstrated how hard it is to find a wood combining all the desirable qualities of red cedar.

PENCIL STOCK.
Table 11.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Red cedar	5,300,000	99.53	$ 8.30	$ 44,000	3,900,000	1,400,000
White cedar	25,000	.47	7.48	187	25,000	.....
Totals	5,325,000	100.00	$ 8.30	$ 44,187	3,925,000	1,400,000

Woodenware and Novelties.

Novelties and woodenware include a considerable but indefinite number of commodities. Novelties are small articles of various kinds and are either useful or ornamental. Some of the most common are paper knives, pen racks, rulers, small trays, boxes and receptacles for buttons, thread, jewelry and the like; two-piece boxes produced by the lathe, in which ink bottles, paints, pills, powders and other similar articles are shipped and sold. The line between novelties and toys on the one hand and woodenware on the other cannot be very clearly drawn. Whole groups of articles may fall in doubtful classes. Exact definitions and strict classifications are not necessary in a report such as this, which deals with the woods used rather than the particular uses of the commodities produced. Woodenware may be a little more definitely defined, but here, too, there is often room for uncertainty regarding the exact limits of the industry. It is generally understood that woodenware overlaps on cooperage in certain directions. Small vessels made of staves are the work of the cooper, yet some of such belong with woodenware. Among that sort are firkins, keelers, piggins and small buckets and tubs, found principally in kitchen and pantry. Stave-made receptacles for salt, pepper, spices and other condiments used in cooking, are in this class. Water pails and candy buckets are within the limits also. A large part of the red cedar shown in Table 12 was manufactured into ware of this kind. Tennessee has long been noted for the excellency of its cedarware. A red cedar bucket with brass hoops, made in Tennessee in 1767, was exhibited at the World's Fair held in St. Louis in 1904. The wood was sound and the hoops were bright after the lapse of 137 years. Factory-made ware of this kind has taken the place of the hand-made articles of former times. Not only is the red cedar more largely used than any other wood in this industry in Tennessee, but it is higher in price than any other. The entire quantity used grew in the state.

WOODENWARE AND NOVELTIES.
Table 12.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Red cedar	1,036,800	31.79	$24.00	$ 24,888	1,036,800	.....
Cottonwood	1,000,000	30.66	20.00	20,000	.....	1,000,000
Red gum	750,000	22.99	20.00	15,000	.....	750,000
Cypress	250,000	7.66	20.00	5,000	.....	250,000
Beech	165,000	5.06	10.36	1,710	165,000	.....
Basswood	60,000	1.84	22.00	1,320	60,000	.....
Totals	3,261,800	100.00	$20.82	$ 67,918	1,261,800	2,000,000

Other articles than woodenware belong in this industry, and other woods furnish large amounts of material in Tennessee. Cottonwood follows cedar in amount, but all of the raw material comes from without the state. It is made into washboards, ironing boards, bread boards, cutting boards, drying racks and numerous articles found in kitchen, pantry and laundry. Cottonwood's white color is one of its good qualities. This makes it particularly serviceable where stenciling and printing are to be done on it. Makers of washboards value cottonwood highly because it stencils so well. Basswood closely resembles cottonwood in color and character of the wood, is used for the same purposes and is a little higher in price. It has some uses for which cottonwood is not suitable. One of these is pyrography, where pictures, ornaments and decorations are burned in wooden panels and platters with a hot needle. Some articles of this kind should be classed as novelties, some as woodenware and still others are so well executed that they might be classed as works of art.

Red gum and cypress in the table aggregate a million feet. They are all-round woods for this industry and are made into some of the commodities named above and into many others, such as rolling pins, chopping bowls, wooden dishes, vegetable cutters, bread boxes, etc. Beech is one of the best woods of which to manufacture the class of ware represented by thin veneer picnic plates and pie platters. It is produced in sheets of veneer one-twentieth of an inch thick, or less, and is cut to the desired size and pressed into shape. It is bought in the log, and for that reason is cheaper than the other woods in Table 12.

Trunks and Valises.

One of the most noticeable features of Table 13 is the difference in cost of woods used in manufacturing an article as simple as a trunk. Nevertheless, there is need of woods of different properties and grades, and this accounts for part but not all of the difference in cost. Next to the highest in price is elm, which is generally a cheap wood. Its high cost to trunk makers in Tennessee is due to the fact that many of the users buy it after it is cut to the exact sizes needed. It is thus a manufactured article when bought and all waste has been removed. It is made into slats to strengthen the tops, sides and bottoms. Trunk makers in some other regions buy this material in the rough and work out the slats in their own factories, and, of course, they buy it cheaper. Prices paid for elm by trunk makers in four states, including Tennessee and ranging northward, are, Tennessee $37.87; Kentucky, $17.82; Illinois, $25.60; Wisconsin, $24.23.

What is true of the prices of elm is true of other woods employed by trunk manufacturers. Where a marked difference in cost exists for the same kind of wood, it is due to the form in which the manufacturers bought it. In Wisconsin cottonwood costs $27; in Kentucky, $37.50, and in Tennessee, $41.36. This wood is purchased as veneer, either in large single sheets or glued together in three or more ply and cut to the exact sizes needed, and in some instances it is bent in the form desired. Tennessee trunk makers bought yellow poplar for trays and compartments at $17.33; in Kentucky it cost $10 a thousand more. In Tennessee buckeye costs $21.33, in Kentucky $22. Similar comparisons might be made for other woods, and as great differences and as close agreements may be shown. The shortleaf pine reported second in quantity in Tennessee is so low in price that it can be no other than low-grade lumber employed in making very cheap trunks. The hickory and ash listed in this industry are used for slats. Woods made into veneer and used in several thicknesses are yellow poplar, basswood, buckeye and cottonwood. These are generally cut by the rotary process and may be had in sheets of any size wanted. This is an important consideration, for when a sufficient number of sheets have been glued one upon another to give the desired strength they may be cut to size, and by bending, a single piece will make the bottom and two sides of a trunk. It was formerly the custom to construct the box of a trunk of lumber and cover it with leather. That was before the days of the railroads, when the trunk that traveled at all went by boat and stage coach, and was handled with due consideration of the feelings of the owner, who was usually standing by and watching it go aboard or come off. But when trunks began to go by rail and chute-the-chutes in modern stations, stronger material than boards and calf skin had to be found for their construction; and sheets of veneer with an abundance of brass reinforcement and sheet iron overlay were brought into use.

TRUNKS AND VALISES.
Table 13.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Yellow poplar	1,181,000	40.86	$17.33	$ 20,470	1,181,000	.....
Shortleaf pine	700,000	24.22	9.00	6,300	700,000	.....
Basswood	310,000	10.73	24.56	7,614	205,000	105,000
Chestnut	200,000	6.92	16.00	3,200	100,000	100,000
Buckeye	180,000	6.23	21.33	3,840	105,000	75,000
White elm	168,000	5.81	37.87	6,362	143,000	25,000
White ash	75,000	2.60	13.27	995	40,000	35,000
Hickory	50,000	1.73	20.00	1,000	25,000	25,000
Red gum	15,000	.52	32.00	480	15,000	.....
Cottonwood	11,000	.38	41.36	455	11,000	.....
Totals	2,890,000	100.00	$17.55	$ 50,716	2,525,000	365,000

The average cost of all wood used by trunk makers in Tennessee is $17.55; in Wisconsin, $23.11; Illinois, $30.01; and Kentucky, $44.81.

Agricultural Implements.

The line between a tool and an implement is not very definite when it concerns agricultural machinery. In a general way tools are small and implements large; tools are operated by hand and implements by horses or some other power. These are not hard-and-fast definitions, and it would not be difficult to find exceptions. The commodities represented in Table 14 belong chiefly to the implement class, if a difference is to be drawn between implements and tools. The sickle, scythe, cradle, hoe, flail and pitchfork are tools; the mowing ma-

chine, thresher, plow and cultivator are implements.

About half of all the wood reported was white oak, which includes a number of species. This wood possesses most of the properties demanded in this industry, the chief one being strength and the next hardness. Where hardness alone will suffice, beech answers well. It is suited for slides where one part of the machine must work back and forth, the surfaces sliding upon each other. The high cost of the beech in Table 14 indicates that the best grades were in demand. The wood is liked well for the felloes of very heavy wheels. Red oak and chestnut oak are utilized for strong frames. A large amount of yellow poplar appears, and much of it was made into hoppers, seed boxes, chutes, drawers and compartments in fanning mills, cleaners, drills and threshers. The shortleaf pine was used for the same purposes. It might be expected that ash would appear in this industry, and its qualities make it suitable for many purposes; but it is identified with the tool industry rather than wth the manufacture of implements. If such tools as pitchforks, rakes, hoes, shovels and scythes were included in Table 14, ash would appear in large amounts, for it is the usual handle wood for such tools.

The manufacturer of agricultural implements is not yet as important in Tennessee as in some other states, but the abundance of raw material in the region and the accessibility of many markets justify the prediction that before many years Tennessee will attain a high place among the states in the manufacture of machinery for the farms. The fertility of the land, the diversified surface which calls for crops of various kinds and the mildness of the climate and abundance of rainfall assure great and permanent prosperity for Tennessee farmers. They will buy more farm implements in the future than in the past, for scientific methods are replacing the poor makeshifts of yesterday. Up-to-date farming calls for better machines and more of them. The forests of Tennessee contain an abundance of the woods needed in that line of manufacture, and the people have made a beginning in putting it to use. It is only a beginning, however. Tennessee ships twice as much implement wood to Illinois, there to be manufactured, as is worked up at home; and in many instances the finished machines are shipped to the region where the woods grew and are sold there. Full development of home resources will demand the manufacture of this wood at home. The state may become a manufacturing center along that line, instead of a feeder for other manufacturing centers. A comparison of what Tennessee is doing and what some of its neighboring states are doing is worth consideration. The state annually uses 2,890,000 feet of wood in producing agricultural implements, and pays an average of $22.58 per thousand for it. North Carolina uses 3 391,000 feet and pays $11.95; Kentucky, 6,610,000 feet at a cost of $32.54; while Illinois, which has a comparatively small supply of home-grown wood and buys from other states 99.9 per cent of what it makes into implements, uses 103,649,000 feet, and pays $34.54 a thousand for it.

AGRICULTURAL IMPLEMENTS.
Table 14.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
White oak	1,425,000	49.31	$23,28	$ 33,175	725,000	700,000
Yellow poplar	450,000	15.57	18.44	8,300	400,000	50,000
Red oak	425,000	14.71	29.65	12,600	75,000	350,000
Shortleaf pine	325,000	11.24	20.00	6,500	325,000	.....
Chestnut oak	250,000	8.65	17.20	4,300	250,000	.....
Beech	15,000	.52	25.00	375	15,000	.....
Totals	2,890,000	100.00	$22.58	$ 65,250	1,790,000	1,100,000

Sporting and Athletic Goods.

Table 15 represents, in Tennessee, what is properly termed a one-wood industry. That wood is hickory. Two others are listed, but they constitute less than three per cent of the whole. Golf sticks are the principal commodity. The shaft is hickory and the head persimmon. No explanation has been offered why dogwood is absent from Table 15, for it is one of the best materials for golf heads, and it is abundant in Tennessee. The head of a golf club must fulfill exacting requirements. It must be elastic and of sufficient hardness and toughness to wear smooth. Some woods which possess part of the requisite qualities lack the essential—they burst under the impact of the blow. That is the fault of hickory as the head of a golf stick, though as a shaft it has no equal. The two parts—head and shaft—call for different properties, and no wood, as far as present knowledge goes, possesses both of them in a high degree. That is why a golf stick is always of two kinds of wood. English beech, which differs somewhat from the American tree, was once the favorite wood for golf heads in this country as well as abroad; but it has lost its place to dogwood and persimmon.

More use is made of persimmon's white sapwood than of the heart which is dark. Shuttlemakers also want the sapwood, and the combined demand is met at the expense of the persimmon's dark heartwood which must find a market elsewhere.

The white ash listed in Table 15 was bought by makers of ball bats. The low price of hickory is due to its purchase in the log or bolt form. The average value of hickory lumber in the mill yards of Tennessee in 1909, which are the latest available figures, was $37.13, more than double the cost of the wood as listed in Table 15. Though in 1909 and again in 1910 Tennessee led all the other states in the quantity of hickory lumber produced, yet the makers of athletic goods in the state are sending outside for 98 per cent of their supply of this wood. The reason for it is that some of the largest users are near the state line, and it happens that the most convenient supply of the wood is across the border.

SPORTING AND ATHLETIC GOODS.
Table 15.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Hickory	2,550,000	97.14	$17.25	$ 44,000	50,000	2,500,000
White ash	60,000	2.29	22.50	1,350	60,000	.....
Persimmon	15,000	.57	35.00	525	15,000	.....
Totals	2,625,000	100.00	$17.48	$ 45,875	125,000	2,500,000

Shuttles, Spools and Bobbins.

The three classes of commodities heading Table 16 are usually grouped as one industry because they are purchased by factories which spin and weave; but as far as Tennessee is concerned, shuttles constitute nearly the whole output of the industry. Two woods are employed, dogwood and persimmon. These have long been considered the best available material in this country for shuttles, though search for others has been wide and thorough since the advance in cost of Turkish boxwood took it from the American shuttlewood market. Dogwood and persimmon possess all the desired properties, though some of them in a less degree than boxwood. But when the Tennessee woods can be bought at less than three cents a foot, and boxwood costs nearly a dollar a foot, it is evident that the supply will be met by woods from Tennessee and surrounding regions. The preceding industry, Table 15, shows the use of persimmon for gold heads. The heartwood is rejected as it is in shuttle making. The waste of the dark-colored heart would be complete were it not so well adapted to other uses. The persimmon is a species of ebony, and the heart is the portion which shows the color. It is bought by manufacturers of parquet flooring and by some furniture makers.

The persimmon tree grows to large size and passes through saw mills like other saw-logs. Statistics have not been compiled in a way to show the quantity of persimmon cut, nor the states which lead in production. It is known, however, that the amount is not large, and the persimmon is justly listed among the minor species. It is well known, also, that the principal supply comes from North Carolina, Tennessee, Arkansas and the regions immediately north and south of those states. The tree reproduces vigorously and grows with fair rapidity, but a long time is required to produce a trunk large enough to be of much value to the manufacturer. For that reason, the thickets of young persimmon trees which have made their appearance in abandoned fields have not yet contributed much wood for shuttles, golf stick heads or parquet flooring. They may influence the market in years to come.

Dogwood is a more important shuttle wood than persimmon, but the tree is smaller. A trunk as much as a foot in diameter and six or eight feet in length is an exception to the rule. The trunk is usually nearly all sapwood of light color, the small core of heartwood being brown. It is not a timber tree and is never cut as saw-logs for the mills. It is too small. For that reason it does not figure in ordinary lumber operations, but is handled in special ways. It is customary for country people to cut dogwood in small lots and haul it to the towns where it is sold to dealers who in turn ship and sell to manufacturers when the collection amounts to a carload or more. The getting together of the wood in this manner is usually done by negroes who are willing to handle small quantities and are content with moderate returns. Often a few sticks, maybe only two or three, are carried to town in small wagons along with farm articles for sale. This custom prevails also in Southern States other than Tennessee. It is not possible to obtain statistics of amounts so many and small, except in the aggregate after they reach the manufacturers. The table shows that most of the persimmon used grew outside the state.

Shuttle blocks are about 17 inches long and somewhat more than two and a quarter inches square. The blocks from which golf stick heads are made are not as long, but are larger in cross section. Dogwood and persimmon are used for both articles. Their hardness and the small liability of the wood to become abraded are their most important properties.

SHUTTLES, SPOOLS, AND BOBBINS.
Table 16.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Dogwood	1,705,000	71.94	$22.07	$ 37,627	1,180,000	525,000
Persimmon	665,000	28.06	26.80	17,825	165,000	500,000
Totals	2,370,000	100.00	$23.40	$ 55,452	1,345,000	1,025,000

Boat and Ship Building.

Without an explanation the heading for this industry would be misleading because no ships and few boats are built in Tennessee. This heading is used for uniformity's sake in all state wood-using reports such as this, and all material employed in the industry is listed in the accompanying table. In Tennessee practically all of the wood reported is white ash, and it is manufactured into oars. The white oak was used for boat repairs, and the cypress is so small in quantity as to be negligible. No other wood is equal to ash in the amount going into oars in the Southern and Middle States, and the product is sold in all parts of this country and in some foreign countries. In certain regions ash comes in competition with other woods for some kinds of oars. Paddles for canoes are of spruce oftener than of ash, for spruce is lighter and is strong enough. The yew tree that grows on the Pacific Coast might compete successfully with ash for oars if it were as abundant and accessible.

Table 17 probably does not do Tennessee justice as an exhibit of its boat building. Large numbers of skiffs and other small boats are made there and are found by thousands on the rivers and creeks; but they are not turned out of large factories and are not shown in the table. They are the output of small shops and of individual workmen in all regions of the state. The fact that they are so made is well known, but it has been impossible to compile figures to be used as statistics. This condition obtains in many regions of the United States. A wagonload of lumber and a few tools suffice for manufacturing small boats, and it is done everywhere and no report is made of it. This explanation is made to correct any wrong impression that might follow from an examination of Table 17. On the face of it Tennessee makes no boats, yet the fact is large numbers are made along the rivers of the state, but not in boat factories. Canoes hewn from trunks of yellow poplar are still occasionally seen on the rivers, though the high value of this wood in the market in recent years has diminished its use for dugouts. Historically yellow poplar has been the greatest boat wood of Tennessee. Reference has already been made to its early use for canoes in war and peace. That use continued for a century or more and has not wholly ceased. The wood was employed in a wasteful manner, for a trunk measuring from two to four thousand feet was often hewed into a single canoe; but yellow poplars of that dimension were plentiful then and it was right that the people should cut them for canoes if they needed them.

Fixtures.

Fixtures, as the term is considered in Table 18, are close akin to furniture, but differ in several

BOAT AND SHIP BUILDING.
Table 17.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
White ash	1,750,000	98.53	$27.00	$ 47,250	.....	1,750,000
White oak	25,000	1.41	23.00	575	25,000	.....
Cypress	1,000	.06	45.00	45	.....	1,000
Totals	1,776,000	100.00	$26.95	$ 47,870	25,000	1,751,000

particulars. Furniture is moved from place to place and is not designed for any particular room or space. Fixtures are intended to remain in the positions where the maker places them, and they cannot be moved without more or less injury. They are divided into three classes, based on the uses intended—office, store and bar. Office fixtures include desks and tables built in certain spaces and intended to be left there; partitions between differern parts of the same room, and benches and seats which are made fast to the walls or the floor. Bar fixtures consist of racks and cabinets for glasses, frames in which to exhibit commodities for sale, and the bar itself. The fixtures for stores include counters, showcases, cabinets, shelves and benches and seats made to fit certain places. Banks use the same class of fixtures as offices. No attempt is here made to name or enumerate all articles classed as fixtures. That would not be possible, for special kinds and odd articles are constantly demanded. Sometimes the line separating fixtures from furniture cannot be exactly defined, nor the separating line between fixtures and finish, but after due allowance is made for exceptions the fixture industry is adequately defined in its scope.

No other industry in Tennessee buys wood of so high average price. The material is expensive because much of it is of high class and must be had in large sizes. Cabinets and counter tops require broad panels, and they are expensive. If extra wide, they are built up, usually of several ply veneer. An examination of Table 18 reveals the fact that a number of woods which are cheap in other industries are costly in this. That is due to high grade and large prices. Sycamore is $30, white ash over $40, red oak, $42, white oak still higher and so on. The cheapest is shortleaf pine. The whole quantity of that wood listed was used by a single manufacturer who was able to buy it cheap. Fixture manufacturers in Kentucky pay an average price of $26.20 for their wood; it costs $34.52 in North Carolina, $41.44 in Illinois, $40.40 in Maryland, $44.12 in Wisconsin, and $38.28 in Tennessee.

It should be borne in mind in this instance as in so many others that a mere ratio between prices for woods employed in a given industry in a number of states is not always a safe ground for the conclusion that the material is cheaper or dearer in one state than in another. A difference in price for a certain wood may be due to difference in grade; or a large amount of a costly wood increases the general average of all; or one cheap wood in large quantity lowers the general average of all. Mahogany in Table 18 cost $155 a thousand, and 80,000 feet were reported. Suppose it had been 800,000 instead of 80,000. The average cost of all woods reported for the industry would be raised above $75 a thousand.

The woods in Table 18 which were largely employed as cores or backing for veneers or as inside frames or shelves are red gum, shortleaf pine chestnut and black gum. The others possess figure, grain or color fitting them for outside places.

FIXTURES.
Table 18.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
White oak	510,000	33.27	$43.33	$ 22,100	285,000	225,000
Red gum	350,000	22.83	16.00	5,600	225,000	125,000
Birch	130,000	8.48	51.85	6,740	30,000	100,000
Shortleaf pine	100,000	6.52	12.00	1,200	100,000	.....
Black gum	100,000	6.52	16.00	1,600	100,000	.....
Mahogany	80,000	5.22	155.00	12,400	.....	80,000
Red oak	80,000	5.22	42.44	3,395	80,000	.....
Chestnut	60,000	3.91	21.33	1,280	50,000	10,000
White ash	55,000	3.59	40.45	2,225	30,000	25,000
Yellow poplar	30,000	1.96	35.00	1,050	30,000	.....
Sugar maple	20,000	1.30	25.00	500	.....	20,000
Sycamore	15,000	.98	30.00	450	7,000	8,000
Black walnut	3,000	.20	50.00	150	1,000	2,000
Totals	1,533,000	100.00	$38.28	$ 58,690	938,000	595,000

Excelsior.

The low average cost of wood bought by excelsior manufacturers is due to purchase in log form. Logs smaller than ordinary saw timber are suitable; but there should not be too many knots. Excelsior is nothing more than narrow shavings cut by machinery adapted to that purpose; and if these shavings are broken into short lengths, as is likely to be the case if the wood is knotty, the product becomes little better than sawdust, and, of course, depreciates in value. The principal use for it is packing breakable articles of merchandise for shipping. If the excelsior is not soft, yielding and somewhat elastic as a mass, its worth is reduced. The machines that make it are equipped with knife-like points for slitting the bolt of wood lengthwise, and another blade that shaves off the scored surface and makes the narrow, thin ribbons of wood constituting the manufactured article. There are different qualities, depending upon the fineness of the ribbons and the quality of the wood used as raw material. Yellow poplar is the leading wood for this industry in Tennessee, and costs $9.58 per thousand feet; in Wisconsin the principal excelsior wood is aspen and costs $11.37; in North Carolina white pine and yellow poplar are reported in equal amounts, the former costing $6.34, the latter $10. Most regions have one or more available woods; some have many. The most essential requirement is that the wood must be fairly light, moderately cheap, not too dark in color, and it must produce elastic excelsior. The article has uses other than as packing material. Upholsterers make mattresses, cushions and filling for seats and backs of parlor furniture of it; but the amount going into commodities of that kind is much smaller than that employed for packing. Excelsior, even of the finest grades, is not in the same class with hair of Spanish moss for upholstery. It is packed in bales like hay and is sold by weight. It is not usually shipped far from the place of manufacture, but each industrial region has factories which supply the markets within reach.

EXCELSIOR.
Table 19.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Yellow poplar	575,000	52.27	$ 9.58	$ 5,510	575,000	.....
Black willow	200,000	18.18	8.15	1,630	200,000	.....
Shortleaf pine	175,000	15.91	8.05	1,409	175,000	.....
Basswood	55,000	5.00	9.11	501	55,000	.....
Buckeye	50,000	4.55	9.24	462	50,000	.....
Cottonwood	45,000	4.09	9.20	414	45,000	.....
Totals	1,100,000	100.00	$ 9.02	$ 9,926	1,100,000	.....

Miscellaneous.

Much wood is used for manufacturing purposes in Tennessee which does not go to any of the industries represented in Tables 2 to 19 inclusive. It is made into various articles, so different in character and purpose that they cannot be logically grouped in amounts large enough to be properly called industries. All such are represented in Table 20 as "Miscellaneous." Eighteen woods are included, all of them American, and all but one—longleaf pine—native of Tennessee. It is not practicable to list all the kinds of articles made from the woods shown in the miscellaneous table; but some of the most important follow.

Some of the black walnut is bought by manufacturers of firearms, and is made into gunstocks and pistol grips. This has always been the leading gunstock wood of Tennessee, as well as of the country generally, and it holds the place in spite of advancing price. It does not appear, however, that the price paid for the walnut in Table 20 was very high. In former times a good many gunstocks were made in Tennessee which never saw a factory. They were cut out by hand for old-fashioned rifles, and were usually of maple. At the present day a few gunstocks are so made in the state, though no report of them was compiled in a way to render the data available for Table 20. Yellow wood (Cladrastis lutea) is used. This wood is known also as yellow ash, yellow locust and gopher wood. It takes a good polish and is serviceable.

White pine is the best wood for patterns because it cuts easily and holds its shape well, provided it has been thoroughly seasoned. Choice pattern woods come from old trees such as are seldom found in forests now. Material of that class is often called pumpkin pine or cork pine. Foundries use some of the best obtainable wood for patterns. Other species have taken the place of white pine for certain kinds of patterns; cypress is one and sugar pine of California is another, but neither of them was reported by pattern makers in Tennessee. Foundry flasks go with patterns. The pattern is a facsimile of the casting to be molded. It is buried in damp sand which is tamped about it. The pattern is then removed in a way provided for, and the hollow space, the shape of the pattern, remains. The metal is poured in and the casting is formed. The flask is the box which holds the sand into which the casting is run. High-class wood is not essential for flask making as it is for patterns. The foundry is not the only user of patterns. They are necessary in shops of many kinds, and a certain class of patterns are called models.

Most of the sycamore and some of the maple in the miscellaneous table were converted into butcher blocks. The old-style block, which was simply a piece of a log the proper length and stood on end, is not holding the ground it once had. Health boards and sanitary committees have discouraged its use on the ground that it is not conducive to health. The piece of a log checks and the opening cracks form lodging places for bacteria and other impurities where the scrubbing brush cannot reach them. The built-up meat block is less objectionable because it checks less. Thoroughly seasoned pieces are fitted together and held with dowels and glue. Blocks of that sort wear as well as the one-piece kind and are replacing them.

Some of the hickory in the table was converted into skewers, a meat shop article, consisting of a small peg for preparing certain cuts of meat for the pot or oven.

A number of woods figure in the manufacture of play-ground equipments which are rapidly gaining in favor in all parts of the country. Among the articles are swings, slides, teeter boards, flying Dutchmen, toboggans and the like.

Brooms are listed among the miscellaneous manufactures. The handle is the only wooden part of most brooms. The search for suitable wood for broom handles is active. At one period in broom-making history in this country it was desirable that the handles be of light material such as basswood and yellow poplar; or, at any rate, woods were not discriminated against because they were light in weight. The advance in recent years in the price of broomcorn has caused manufacturers to look with more favor on heavy woods for handles. Brooms at wholesale are sold by weight, and if the handle is heavy a little less broomcorn may be used without resulting in an underweight broom. Handles are of beech, birch and maple, with smaller lots of other woods. In some Southern States gum and magnolia have been successfully tried.

The manufacturers of pumps draw for supplies upon the woods listed in Table 20. The sucker rods are of ash and hickory; the handles of beech, maple, hickory or ash; and the logs yellow poplar, maple and basswood. The well sweep of early times and the old oaken and cedar buckets that hung in the wells are passing away and the pump is taking their place, but the change is by no means complete in Tennessee. Though the manufacture of pumps has reached respectable proportions, the bucket and sweep linger among the hills and valleys.

Laundry methods and appliances are likewise undergoing change, and a considerable part of the wood listed in the miscellaneous table is converted into washing machines, stationary tubs, wringers, dryers and other modern conveniences which are driving from use the old-time back-breaking tubs made by sawing whiskey barrels in two. The old tub and its worthy mate, the home-made rubbing board, have not disappeared, nor will they soon disappear entirely; but machinery to run by steam or some other power than muscle has entered the field and has lifted from feminine shoulders part of the burden that has oppressed since the days when

MISCELLANEOUS.
Table 20.

Kinds of wood	Quantity used annually feet B. M.	per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee feet B. M.	Grown out of Tennessee feet B. M.
Red gum	3,414,628	24.76	$14.40	$ 49,162	1,050,000	2,364,628
Cottonwood	3,000,000	21.75	21.00	63,000	.....	3,000,000
Hickory	1,352,000	9.80	17.71	23,940	402,000	950,000
White oak	1,187,000	8.61	19.59	23,255	1,187,000	.....
Shortleaf pine	1,080,000	7.83	19.85	21,440	300,000	780,000
Red oak	1,050,000	7.61	18.17	19,075	990,000	60,000
Black ash	700,000	5.07	14.00	9,800	.....	700,000
Yellow poplar	565,000	4.10	18.69	10,560	565,000	.....
Chestnut	400,000	2.90	15.00	6,000	400,000	.....
Beech	325,000	2.36	15.23	4,950	300,000	25,000
Sycamore	200,000	1.45	15.00	3,000	200,000	.....
Sugar maple	115,000	.83	23.13	2,660	50,000	65,000
White ash	100,000	.73	14.00	1,400	100,000	.....
Basswood	100,000	.72	18.00	1,800	100,000	.....
Longleaf pine	100,000	.73	19.00	1,900	.....	100,000
Silver maple	70,000	.51	16.43	1,150	50,000	20,000
Black walnut	25,000	.18	30.00	750	25,000	.....
White pine	8,000	.06	33.75	270	3,000	5,000
Totals	13,791,628	100.00	$17.70	$ 244,112	5,722,000	8,069,628

Homer sang the praises of the washerwoman, Nausicaa.

Supplies for dairymen and poulterers are manufactured on a small scale in Tennessee and employ most of the species shown in Table 20, though none of them in large amounts. Makers of refrigerators draw material from these woods also, and kitchen cabinets belong in the same class. Curtain poles of chestnut are produced in quantity worthy of mention. Well-boring machines are constructed of white and red oak and of ash. Cotton picking baskets are woven of thin strips of white oak.

Summary of Industries.

Table 21 brings together some of the essential features of the preceding tables and affords a brief review of all and a convenient means of comparing them. The term industry as employed in reports such as this is general rather than exact. It is not the same everywhere. Some regions have industries which others have not. For example, Tennessee produces playground equipment, but not in amount sufficient to be called an industry. It is an industry of much importance in Illinois. Tennessee supports a lead pencil stock industry. Illinois has nothing of the kind. What in Tennessee is grouped as a single industry under the name furniture is sufficiently large and diversified to make several industries in Illinois. Thus it goes all the way through the list. In preparing such a report as this, a decision must be arrived at whether the making of a distinct class of commodities in the state is of enough importance to be considered an industry. If not, the material goes into the miscellaneous table. No fixed rule has been set for the minimum quantity of wood for a separate industry. Each case is decided on its merits. In the Missouri report a separate table was given to airship manufacture, though the amount of wood was very small. The reason for doing so was that the line was distinct from all others, and was of special interest. This explanation is offered to remove misunderstanding if such may exist, as to just what is meant by the term "wood-using industry" as it is employed in state reports like this. It is nothing more than a convenient and somewhat arbitrary separation into groups of the woods manufactured in a state, the separation being based not on the kinds of wood, but on the products made. With this explanation, a comparison of Tennessee's wood-using industries with those of a few other states will be of interest.

SUMMARY OF WOODS USED BY INDUSTRIES IN TENNESSEE.
Table 21.

Industries	Quantity used feet B. M.	annually per cent	Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in Tennessee per cent	Grown out of Tennessee per cent
Planing mill products	147,214,950	35.57	$22.03	$3,243,004	66.01	33.99
Boxes and crates (packing)	77,979,510	18.84	16.26	1,267,707	73.44	26.56
Furniture	39,272,500	9.49	22.34	877,221	65.26	34.74
Sash, doors, blinds, and general millwork	38,216,500	9.23	23.87	912,173	39.05	60.95
Vehicles and vehicle parts	33,492,500	8.09	24.99	836,855	86.47	13.53
Car construction	14,164,918	3.42	19.41	274,974	20.04	79.96
Miscellaneous	13,791,628	3.33	17.70	244,112	41.49	58.51
Handles	9,723,776	2.35	22.63	220,086	87.02	12.98
Caskets and coffins	9,494,085	2.29	16.53	156,976	48.46	51.54
Chairs	6,757,000	1.63	15.01	101,448	68.92	31.08
Pencil stock	5,325,000	1.29	8.30	44,187	73.71	26.29
Woodenware and novelties	3,261,800	.79	20.82	67,918	38.68	61.32
Trunks and valises	2,890,000	.70	17.55	50,716	87.37	12.63
Agricultural implements	2,890,000	.70	22.58	65,250	61.94	38.06
Sporting and athletic goods	2,625,000	.64	17.48	45,875	4.76	95.24
Shuttles, spools and bobbins	2,370,000	.57	23.40	55,452	56.75	43.25
Boat and ship building	1,776,000	.43	26.95	47,870	1.41	98.59
Fixtures	1,533,000	.37	38.28	58,690	61.19	38.81
Excelsior	1,100,000	.27	9.02	9,926	100.00	.....
Totals	413,878,167	100.00	$20.73	$8,580,440	63.61	36.39

State.	Industries.	Average Cost of Wood.
Tennessee	19	$20 73
Louisiana	9	11 63
Mississippi	9	12 22
Maryland	13	20 67
Kentucky	19	23 07
Massachusetts	20	21 29
North Carolina	21	14 16
Missouri	24	24 12
Illinois	51	28 76

If the number of woods listed in the state were compared, the differences would be as marked as in cost of material and the number of industries.

Apportionment of Woods Among Industries.

Some industries make use of certain woods only, though others may be available, while other industries take what is cheapest and most convenient. Generally, however, manufacturers choose woods carefully and select those possessing in the highest degree the properties desired. Some manufacturers who specialize on a single commodity use few woods. The maker of pencil slats is an example. He has few species to choose from, for most woods are totally unsuited to his purpose, and he depends upon red cedar in Tennessee. But red cedar is good for many things, and Table 22 shows that five industries use it, though pencil stock takes most. White oak has no place in six of the tables. Makers of pencil slats, shuttles and of excelsior can do nothing with white oak, though other manufacturers could scarcely carry on business without it. It is evident, therefore, that there is no such thing as an all-round wood. More species are good for nothing than are good for everything. Black willow appears in only two columns of Table 22. That is not because it was not fit for any of the other places, but because it was not convenient. The cucumber tree was all used by box and crate makers, and yet it is good material for manufacture into the products of every industry in Tennessee except pencil slats. Scarcity and inconvenience kept it out, although it was probably made use of by a number of factories that did not report it separately because they thought it was basswood.

Cost of Species by Industries.

Table 23 is a companion of 22. The species are the same in both, but the former table showed how the material was apportioned among the industries, and this gives the average cost of each one of the woods to the factories that used them. The first feature to attract attention in studying Table 23 is the remarkable differences in prices paid for the same species. Some paid two or three times as much as others; some of the red cedar and white oak varied as one to five, and black walnut as seven to one. These differences are so great that it becomes necessary to find reasons for them, or the value of the table as statistics will be lessened. No general statement will cover all. Each price must be investigated for itself, for what applies to one may have nothing to do with another. The nearest approach to a general statement that can be made to apply in most instances is that cost of wood is controlled by three factors—grade, supply and convenience. When unexpected differences in cost occur for the same species when bought by several manufacturers, an explanation is usually possible when the three factors—grade, supply and convenience—are analyzed. Sometimes the facts essential to an intelligent analysis are not available, and then the figures lose some of their value.

PERCENTAGE OF THE DIFFERENT KINDS OF WOOD USED BY EACH INDUSTRY.
Table 22.

Kinds of Wood	Agricultural Implements	Boat and ship building	Boxes and crates, packing	Car construction	Caskets and coffins	Chairs	Excelsior	Fixtures	Furniture	Handles	Miscellaneous	Pencil stock	Planing mill products	Sash, doors, blinds and general millwork	Shuttles, spools, and bobbins	Sporting and athletic goods	Trunks and valises	Vehicles and vehicle parts	Woodenware and novelties
Basswood	.....	.....	29.80	.....	8.43	.....	.91	.....	1.77	.....	1.66	.....	40.25	10.95	.....	.....	5.14	.09	1.00
Beech	.26	.....	8.41	.....	.....	2.15	.....	.....	.43	.....	5.58	.....	77.99	1.03	.....	.....	.....	1.32	2.83
Birch	.....	.....	.....	.....	.....	7.33	.....	9.54	1.47	.....	.....	.....	67.13	14.53	.....	.....	.....	.....	.....
Black ash	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	97.90	.....	2.10	.....	.....	.....	.....	.....	.....
Black gum	.....	.....	83.74	.....	.....	.....	.....	9.68	4.34	.....	.....	.....	1.74	.....	.....	.....	.....	.....	.....
Black walnut	.....	.....	.....	.....	3.84	.....	.....	.58	2.38	.....	4.81	.....	74.62	13.08	.....	.....	.....	.19	.....
Black willow	.....	.....	.....	.....	.....	.....	44.44	.....	.....	.....	.....	.....	55.56	.....	.....	.....	.....	.....	.....
Buckeye	.....	.....	74.54	.....	7.04	.....	1.76	.....	1.76	.....	.....	.....	8.56	.....	.....	.....	6.34	.....	.....
Bur oak	.....	.....	.....	100.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Butternut	.....	.....	55.32	.....	.....	.....	.....	.....	.....	.....	.....	.....	44.68	.....	.....	.....	.....	.....	.....
Cherry	.....	.....	.....	.....	.....	.....	.....	.....	2.21	.....	.....	.....	83.00	14.79	.....	.....	.....	.....	.....
Chestnut	.....	.....	7.45	.....	12.82	.....	.....	.44	1.95	.....	2.89	.....	41.10	31.90	.....	.....	1.45	.....	.....
Chestnut oak	50.00	.....	.....	40.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.00	.....	.....	.....	.....	.....
Cottonwood	.....	.....	78.40	.02	.....	.....	.16	.....	.52	.....	10.43	.....	6.95	.....	.....	.....	.04	.....	3.48
Cucumber tree	.....	.....	100.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cypress	.....	.01	.....	.....	14.96	.....	.....	.....	.....	.....	.....	.....	27.73	53.61	.....	.....	.....	.....	3.69
Dogwood	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100.00	.....	.....	.....	.....
Hackberry	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100.00	.....	.....	.....	.....	.....	.....
Hemlock	.....	.....	.....	.....	57.27	.....	.....	.....	.....	.....	.....	.....	42.73	.....	.....	.....	.....	.....	.....
Hickory	.....	.....	.....	.....	.....	.40	.....	.....	.06	26.55	4.16	.....	.....	.....	.....	7.85	.15	60.83	.....
Largetooth aspen	.....	.....	.....	.....	.....	.....	.....	.....	100.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Longleaf pine	.....	.....	.....	29.98	.....	.....	.....	.....	3.39	.....	.52	.....	47.69	15.88	.....	.....	.....	2.54	.....
Mahogany	.....	.....	.....	.....	.....	.....	.....	43.72	.27	.....	.....	.....	54.64	1.37	.....	.....	.....	.....	.....
Osage orange	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100.00	.....
Persimmon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	97.79	2.21	.....	.....	.....
Red cedar	.....	.....	.....	.....	1.46	.....	.....	.....	1.22	.....	.....	81.14	.....	.31	.....	.....	.....	.....	15.37
Red gum	.....	.....	33.47	.....	3.03	*	.....	.70	27.00	.70	6.83	.....	24.99	.32	.....	.....	.03	1.43	1.50
Red oak	.85	.....	.....	.80	.20	9.77	.....	.16	18.23	.....	2.09	.....	60.61	5.74	.....	.....	.....	1.55	.....
River birch	.....	.....	100.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sassafras	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	99.11	.89	.....	.....	.....	.....	.....
Shittimwood	.....	.....	31.34	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	68.66	.....	.....	.....	.....	.....
Shortleaf pine	.60	.....	24.13	9.47	2.93	.....	.32	.18	1.12	.....	1.98	.....	30.07	27.88	.....	.....	1.28	.04	.....
Silver maple	.....	.....	36.46	.....	.....	.....	.....	.....	.....	.....	12.89	.....	50.65	.....	.....	.....	.....	.....	.....
Slippery elm	.....	.....	100.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sugar maple	.....	.....	7.72	.....	.....	14.71	.....	.74	17.43	.....	4.23	.....	55.17	.....	.....	.....	.....	.....	.....
Sycamore	.....	.....	16.16	.....	.....	.....	.....	2.07	1.38	.....	27.63	.....	38.95	13.81	.....	.....	.....	.....	.....
Table Mt. pine	.....	.....	100.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Texan oak	.....	.....	.....	100.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tupelo	.....	.....	2.53	.....	.....	.....	.....	.....	42.62	.....	.....	.....	54.85	.....	.....	.....	.....	.....	.....
White ash	.....	24.81	1.25	.....	.....	.....	.....	.78	9.28	1.42	1.42	.....	41.36	8.58	.....	.85	1.06	9.19	.....
White cedar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100.00	.....	.....	.....	.....	.....	.....	.....
White elm	.....	.....	29.41	.....	.....	.....	.....	.....	21.65	.....	.....	.....	7.06	2.35	.....	.....	39.53	.....	.....
White oak	2.30	.04	1.50	3.88	.....	1.78	.....	.82	19.46	1.05	1.92	.....	45.07	5.20	.....	.....	.....	16.98	.....
White pine	.....	.....	41.43	.....	36.34	.....	.....	.....	.....	.....	.35	.....	21.22	.44	.....	.....	.....	.22	.....
Yellow ash	.....	.....	11.77	.....	.....	.....	.....	.....	29.41	.....	.....	.....	58.82	.....	.....	.....	.....	.....	.....
Yellow poplar	.88	.....	31.65	.02	3.03	.....	1.12	.06	2.03	.....	1.11	.....	49.81	7.04	.....	.....	2.31	.94	.....

* Less than 1-100 of 1 per cent.

An example from actual statistics compiled in course of the preparation of this series of state wood-using reports will illustrate this better than it can be done by laying down general rules. A maker of fine furniture in Massachusetts paid $750 a thousand for exquisitely figured mahogany; a coffin maker in Louisiana bought toredo-bored mahogany from Honduras for one-twentieth of that price. These figures for mahogany placed side by side with no explanation of grade or condition would raise doubt in most minds concerning the correctness of the statistics. The difference is so great as to appear unreasonable. It would seem more unreasonable if both purchases were made in the same state, instead of fifteen hundred miles apart; yet both might have occurred in the same city. Each manufacturer bought the kind and grade he needed, and the price paid by each was reasonable.

Table 23 shows many costs of woods in which differences for some species are great, though none in quite such marked contrast as in the case of feather mahogany in Massachusetts and the perforated grade in Louisiana. There is a reason in practically every instance where large difference in cost is shown, but to seek out and present all conditions and circumstances for so many prices would swell the report to a size that would discourage rather than stimulate careful study.

larly desirable that a paying by-product be made from the dust. A slat man in Tennessee sells his dust to chemists who make "moth medicine." Another cedar mill converts its scraps into cedar oil. A porch column manufacturer sells the blocks from his establishment to a maker of large two-piece boxes, such as powders and lubricants are sometimes packed in.

These are a few of the rather large number of instances where what seemed to be hopeless waste was converted into profit by simply finding the men who wanted it. If a thing is fit for use, there is nearly always some one somewhere who wants it. Some wastes go on, and at present no practicable remedy has been found. Large quantities of very small, odd-sized blocks accumulate about wood-working factories, and efforts to find some use other than fuel for them have thus far been unavailing. Cheaper distillation plants than are now in use may at some future time convert such waste, including shavings and sawdust, into salable by-products.

Appendix.

The foregoing parts of this report were compiled from data collected by the Forest Service in the winter of 1911-12. The state has forest resources not fully shown in the figures thus far presented which deal only with manufactured products, with wood 614,000 feet were softwoods. The quantities by species follow:

	Feet.
Oak	421,925,000
Yellow poplar	138,705,000
Yellow pine	89,296,000
Red gum	62,461,000
Chestnut	58,049,000
Hickory	45,151,000
White pine	39,387,000
Hemlock	36,744,000
Red cedar	31,683,000
Beech	16,385,000
Ash	15,043,000
Cypress	10,333,000
Cottonwood	8,954,000
Basswood	8,500,000
Maple	8,289,000
Elm	7,225,000
Sycamore	5,026,000
Walnut	3,432,000
Tupelo	2,670,000
Birch	807,000
Spruce	171,000
All others	6,239,000
Total	1,016,475,000

The above table shows the cut of lumber in the state. About 260,000,000 feet of this was further manufactured, and is represented in Tables 1 to 23, inclusive, in this report. The remaining 756,000,000 feet were used in the rough or were shipped out of the state.

AVERAGE COST OF THE DIFFERENT KINDS OF WOOD USED BY EACH INDUSTRY.

Table 23.

Kinds of Wood	Agricultural Implements	Boat and ship building	Boxes and crates, packing	Car construction	Caskets and coffins	Chairs	Excelsior	Fixtures	Furniture	Handles	Miscellaneous	Pencil stock	Planing mill products	Sash, doors, blinds, and general millwork	Shuttles, spools, and bobbins	Sporting and athletic goods	Trunks and valises	Vehicles and vehicle parts	Woodenware and novelties
Basswood	.....	.....	$17.35	.....	$20.82	.....	$ 9.11	.....	$24.60	.....	$18.00	.....	$18.87	$25.68	.....	.....	$24.56	$31.09	$22.00
Beech	$25.00	.....	15.21	.....	.....	$12.30	.....	.....	18.48	.....	15.23	.....	18.12	14.83	.....	.....	.....	20.52	10.36
Birch	.....	.....	.....	.....	.....	12.00	.....	51.85	18.00	.....	.....	.....	37.60	31.06	.....	.....	.....	.....	.....
Black ash	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14.00	.....	12.00	.....	.....	.....	.....	.....	.....
Black gum	.....	.....	9.69	.....	.....	.....	.....	16.00	15.00	.....	.....	.....	12.72	.....	.....	.....	.....	.....	.....
Black walnut	.....	.....	.....	.....	45.00	.....	.....	50.00	36.67	.....	30.00	.....	20.43	39.49	.....	.....	.....	175.00	.....
Black willow	.....	.....	.....	.....	.....	.....	8.15	.....	.....	.....	.....	.....	12.50	.....	.....	.....	.....	.....	.....
Buckeye	.....	.....	17.29	.....	18.00	.....	9.24	.....	20.00	.....	.....	.....	13.72	.....	.....	.....	21.33	.....	.....
Bur oak	.....	.....	.....	20.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Butternut	.....	.....	9.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	18.95	.....	.....	.....	.....	.....	.....
Cherry	.....	.....	.....	.....	.....	.....	.....	.....	40.00	.....	.....	.....	20.00	53.21	.....	.....	.....	.....	.....
Chestnut	.....	.....	15.02	.....	13.94	.....	.....	21.83	13.57	.....	15.00	.....	27.59	35.06	.....	.....	16.00	.....	.....
Chestnut oak	17.20	.....	.....	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	15.00	.....	.....	.....	.....	.....
Cottonwood	.....	.....	21.99	20.64	.....	.....	9.20	.....	25.00	.....	21.00	.....	17.50	.....	.....	.....	41.36	.....	20.00
Cucumber tree	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cypress	.....	45.00	.....	.....	15.96	.....	.....	.....	.....	.....	.....	.....	27.47	33.42	.....	.....	.....	.....	20.00
Dogwood	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22.07	.....	.....	.....	.....
Hackberry	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.50	.....	.....	.....	.....	.....	.....
Hemlock	.....	.....	.....	.....	12.00	.....	.....	.....	.....	.....	.....	.....	9.43	.....	.....	.....	.....	.....	.....
Hickory	.....	.....	.....	.....	.....	12.62	.....	.....	19.50	22.80	17.71	.....	.....	.....	.....	17.25	20.00	23.94	.....
Largetooth aspen	.....	.....	.....	.....	.....	.....	.....	.....	25.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Longleaf pine	.....	.....	.....	21.32	.....	.....	.....	.....	18.77	.....	19.00	.....	20.97	16.35	.....	.....	.....	20.05	.....
Mahogany	.....	.....	.....	.....	.....	.....	.....	155.00	300.00	.....	.....	.....	116.00	188.00	.....	.....	.....	.....	.....
Osage orange	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200.00	.....
Persimmon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	26.80	35.00	.....	.....	.....
Red cedar	.....	.....	.....	.....	42.00	.....	.....	.....	36.88	.....	.....	8.30	.....	33.75	.....	.....	.....	.....	24.00
Red gum	.....	.....	12.92	.....	14.96	10.00	.....	16.00	14.55	10.00	14.40	.....	12.92	17.86	.....	.....	32.00	25.15	20.00
Red oak	29.65	.....	.....	16.25	18.00	15.53	.....	42.44	24.03	.....	18.17	.....	24.88	21.66	.....	.....	.....	31.33	.....
River birch	.....	.....	12.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sassafras	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20.00	24.67	.....	.....	.....	.....	.....
Shittimwood	.....	.....	14.11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19.00	.....	.....	.....	.....	.....
Shortleaf pine	20.00	.....	12.45	18.00	12.97	.....	8.05	12.00	16.61	.....	19.85	.....	17.41	17.88	.....	.....	9.00	18.00	.....
Silver maple	.....	.....	13.33	.....	.....	.....	.....	.....	.....	.....	16.43	.....	12.78	.....	.....	.....	.....	.....	.....
Slippery elm	.....	.....	15.19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sugar maple	.....	.....	15.00	.....	.....	12.38	.....	25.00	25.19	.....	23.13	.....	19.97	.....	.....	.....	.....	.....	.....
Sycamore	.....	.....	11.65	.....	.....	.....	.....	30.00	16.00	.....	15.00	.....	13.67	15.00	.....	.....	.....	.....	.....
Table Mt. pine	.....	.....	12.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Texan oak	.....	.....	.....	18.49	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tupelo	.....	.....	12.00	.....	.....	.....	.....	.....	19.97	.....	.....	.....	24.23	.....	.....	.....	.....	.....	.....
White ash	.....	27.00	13.00	.....	.....	.....	.....	40.45	24.27	10.00	14.00	.....	18.71	31.74	.....	22.50	13.27	18.12	.....
White cedar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7.48	.....	.....	.....	.....	.....	.....	.....
White elm	.....	.....	14.88	.....	.....	.....	.....	.....	18.05	.....	.....	.....	16.33	14.00	.....	.....	37.87	.....	.....
White oak	23.28	23.00	16.83	18.65	.....	14.55	.....	43.33	29.92	29.23	19.59	.....	24.27	25.78	.....	.....	.....	26.19	.....
White pine	.....	.....	16.11	.....	16.01	.....	.....	.....	.....	.....	33.75	.....	16.53	20.00	.....	.....	.....	28.00	.....
Yellow oak	.....	.....	12.00	.....	.....	.....	.....	.....	16.00	.....	.....	.....	15.00	.....	.....	.....	.....	.....	.....
Yellow poplar	18.44	.....	15.23	42.12	22.63	.....	9.58	35.00	25.25	.....	18.69	.....	24.08	30.28	.....	.....	17.33	43.07	.....
	$22.58	$26.95	$16.26	$19.41	$16.53	$15.01	$ 9.02	$38.28	$22.34	$22.63	$17.70	$ 8.30	$22.03	$23.87	$23.40	$17.48	$17.55	$24.99	$20.82

Saving Waste.

The waste problem is ever present in wood-working establishments. There are few manufacturers who do not carefully study it. The day has passed when valuable lumber is wilfully thrown away. Some of it still goes to the furnace or the scrap pile, but it is because no way has been found to make a profit from the rejected material. The constant working of many persons along the line of better utilization has cut down waste in many quarters. A tendency toward a certain kind of co-operation among manufacturers is observable. They are helping one another to use scraps, and, of course, each expects to make something for himself while he is helping others. If one has material which he cannot use, he tries to find some one who can use it; or if he needs stuff which may be in some one's else scrap heap, he makes his wants known, and increased business for both often follows. A piano manufacturer needed choice wood for sharps, and found enough to make 80,000 in the waste heap of a shuttle block maker. Another factory man was in the market for small pieces of hardwood for a certain kind of chisel handle, and he, too, found what he wanted in a shuttle block maker's back yard. Workers in red cedar sell their sawdust to floor sweeping compound companies. Pencil slat cedar is sawed in small pieces and much of it goes to sawdust, and it is particu-

converted into finished articles ready for use; but a great deal of other material comes from Tennessee's timber regions. Much rough lumber is consumed without passing through any shop or factory after it leaves the saw mill. It is built into bridges, frames of houses, fences, railroads and is in other ways disposed of without further manufacture. Material of that kind has not been accounted for up to this point in this report. It is evident that justice would not be fully accorded the state's forest resources in any report which does not take rough lumber into account and show how much is used without further manufacture after it has left the saw mill. Unfortunately, complete data of that kind can not be presented because it was never collected; but the United States Census Bureau has compiled statistics showing the annual cut of lumber in Tennessee by species; the extent of the cooperage business; the output of veneers, and other facts concerning woods which go in the rough or partly rough condition to the consumer. The figures which follow have been condensed from the latest available census returns for Tennessee.

Lumber Cut in 1910.

Saw mills in Tennessee to the number of 1,774 reported to the Bureau of the Census a cut of 1,016,475,000 feet of lumber in 1910, of which 207,-

Other Products.

The yearly output of lath in Tennessee, as shown by the census figures, is 21,550,000; and of shingles 19,044,000.

Cooperage is a large business in the state and is of two kinds—tight and slack. Tight cooperage is of a kind made to contain such liquids as oil, whiskey, wine, beer, etc., and slack cooperage is means for dry commodities, such as vegetables, fruits, cement, lime and numerous others. The line separating the two kinds is at times distinct enough, and at times there seems to be overlapping. Generally tight cooperage is understood to hold oils, wines and spiritous liquors, and all other kinds are slack cooperage. Statistics show that in 1910 Tennessee produced 60,938,000 tight cooperage staves, most of which were oak, and 5,390,978 sets of heading. Many woods are not fit for tight cooperage. Some contain substances which color or taint the contents, but the chief objection to the majority of woods is that they are too porous and leakage results.

Almost any wood that may be had in sufficient quantity and of adequate size is suitable for some sort of slack cooperage. There is ample room, however, for choice among the many available woods. Some suit one thing best, some another. Butter tubs are not made from woods with strong odors, but material of that kind is not objectionable for

cement barrels. Strength has much to do with the suitability of a wood for a specific purpose. Red gum, cottonwood, elm and most of the oaks are strong enough for all ordinary purposes. Cottonwood is excellent material for flour barrels, and yellow poplar for tobacco hogsheads, though less of it is so used than formerly. The following figures show Tennessee's output of slack cooperage in 1910 and the woods, with the amount of each:

	Staves.
Oak	16,632,000
Cottonwood	12,366,000
Red gum	11,925,000
Elm	3,736,000
Ash	2,247,000
Maple	703,000
Beech	500,000
All others	1,621,000
Total	49,730,000

Heading is counted by sets, and the number in Tennessee in 1910 was 2,572,000 of all woods, and of hoops 18,041,000.

In the manufacture of hoops in Tennessee elm is by all odds the most important wood. The hoops are sawed from logs. A great change in hoop making has occurred in the last fifty years. The hoop-pole business, as it once existed, seems to be no more in Tennessee. The hoops were once made from little saplings, from one to two inches in diameter. Such a sapling made one hoop, or if it would split nicely it was good for two. These were cut by thousands, and most of them were shaved and notched at odd times by farmers who traded them for merchandise or sold them for what cash they would bring. It was a remarkably wasteful business. No one who cut the saplings then seemed to consider that every one was a little tree which, if left alone, would become a large tree. The straightest and best were taken, and they were the ones to grow into the best trees. Fortunately that business is a thing of the past in Tennessee, and they now make hoops of large trees.

In 1910 Tennessee stood eighth among the states in the output of veneer, its total being 27,665,000 feet, log scale. Veneer is lumber cut very thin. So thin are some of the sheets that more than one hundred are required to make one inch in thickness. Most of the veneer is not nearly as thin. It is of three kinds, classified according to the method of manufacture in rotary cut, sawed and sliced. More than nine-tenths of all veneer produced in this country is rotary cut. Expensive hardwoods are usually sawed or sliced. Spanish cedar, a moderately cheap foreign softwood, used by cigar box makers, is often sliced very thin. Rotary cut veneer is reduced from the round log, by revolving it against a strong knife which pares off a thin layer round and round until only a small core remains of the log. Thin saws convert seasoned lumber into veneer, or a log may be forced over the edge of a powerful knife and the sliced article results. The forests of Tennessee contributed liberally to the country's supply of tanning materials, though some was used in that state which came from elsewhere. In 1910 the reported quantity of hemlock bark was 1,193 tons, worth $9,505; oak, 23,843 tons, worth $200,396.

Uses of Wood.

Manufacturers and others in Tennessee reported the following uses for the various woods listed in Table 1. It should not be understood that these are all the uses that have been found for wood. They include only those reported during the progress of the investigation in the state.

Basswood.

Blinds.
Caskets and coffins.
Coat hangers.
Curtain poles.
Crating.
Doors.
Excelsior.
Finish (interior).
Frames (window).
Furniture.
Screens.
Trunks.

Black Gum.

Berry crates.
Church pews.
Egg cases.
Finish (interior).
Furniture (inside).
Siding.
Table legs.

Black Walnut.

Altars.
Beds.
Cabinet work.
Caskets.
Church fixtures.
Finish (interior).
Furniture.
Gum stocks.
Moldings.
Musical instruments.
Stair work.

Black Willow.

Boxes (packing).
Casing.
Excelsior.
Furniture (inside).

Beech.

Bed slats.
Brown handles.
Chairs.
Curtain poles.
Flooring.
Furniture (inside).
Kitchen cabinets.
Kitchen tables.
Siding.
Tables.
Wagon boxes.

Birch (Yellow).

Balusters..
Cabinet work.
Casing.
Chairs.
Doors.
Dressers.
Finish (interior).
Furniture.
Mantels.
Musical instruments.
Stair work.
Tables.
Wardrobes.

Buckeye.

Boxes.
Caskets and coffins.
Casing.
Egg crates.
Excelsior.
Flooring.
Trunks.

Butternut.

Chairs.
Church pews.
Finish (interior).
Fixtures (store and office).
Molding.

Chestnut.

Boxes (packing).
Casing.
Caskets and coffins.
Crates.
Curtain poles.
Doors.
Finish (interior).
Furniture.
Mantels.
Moldings.
Screens.
Trunk slats.

Cherry.

Cabinets.
Car construction.
Finish (interior).
Furniture.
Mantels.
Moldings.
Showcases.
Store fixtures.
Window frames.

Chestnut Oak.

Ceiling.
Finish (interior).
Flooring.
Plow handles.

Shittimwood.

Boxes (packing).
Finish (interior).
Furniture (inside).
Imitation work.
Mantels.
Sash.

Cottonwood.

Box boards (wagons).
Boxes (crating).
Butter pails.
Candy baskets.
Egg cases.
Excelsior.
Panels (wagon).
Oil boxes.

Cucumber Tree.

Boxes.
Cabinet work.
Doors.
Finish (interior).
Furniture (inside).
Sash and frames.

Cypress.

Balusters.
Boats.
Butter tubs.
Candy pails.
Casing.
Cornice.
Frames (doors).
Panels.
Sash.
Siding.
Tanks.
Window frames.

Dogwood.

Bobbins.
Shuttle blocks.

Hackberry.

Boxes (packing).
Crates.
Coops.
Egg cases.
Trunk slats.

Hemlock.

Boxes.
Ceiling.
Crates.
Sheathing.
Siding.
Weatherboardings.

Hickory.

Athletic goods.
Cant-hook handles.
Chairs.
Chicken coops.
Handles.
Golf sticks.
Meat skewers.
Spokes.
Sucker rods.
Trunk slats.
Wagon stock.

Longleaf Pine.

Agricultural implements.
Car construction.
Curtain poles.
Doors.
Flooring.
Finish (interior).
Framing.
Hoppers.
Pickets.
Refrigerators.
Sash.
Sign boards.
Spring cot frames.
Wagon beds.

Mahogany.

Bank fixtures.
Bureaus.
Cabinet work.
Car construction.
Caskets.
Furniture.
Mantels.
Panels.
Sash, doors, etc.
Tables.
Window screens.

Persimmon.

Bobbins.
Golf-stick heads.
Shuttle blocks.

Red Cedar.

Buckets.
Cabinets.
Cedar chests.
Ceiling.
Coffins.
Flooring.
Novelties.
Pencil stock.
Siding.
Wardrobes.

Red Gum.

Berry baskets.
Ceiling.
Chairs.
Chicken coops.
Church pews.
Curtain poles.
Finish (interior).
Furniture.
Handles.
Mantels.
Molding.
Pump stock.
Siding.
Wagon boxes.

Red Oak.

Chairs.
Chicken coops.
Ceiling.
Curtain poles.
Doors.
Flooring.
Finish (interior).
Furniture.
Hat racks.
Kitchen cabinets.
Mantels.
Moldings.
Panels.
Plow handles.
Refrigerators.
Screens.
Siding.
Tables.
Wagon stock.

River Birch.

Berry cases.
Cabinet work.
Furniture.

Sassafras.

Boxes.
Cabinets.
Doors.
Molding.
Sash frames.
Window frames.

Sycamore.

Berry cases.
Curtain poles.
Egg cases.
Finish (interior).
Fixtures (office and store).
Furniture.
Show cases.
Table legs.

Silver Maple.

Baskets.
Berry cases.
Chairs.
Curtain poles.
Egg crates.
Flooring.
Finish (interior).
Furniture.
Mantels.
Refrigerators.

Sugar Maple.

Base boards.
Broom handles.
Boxes.
Chairs.
Couch frames.
Curtain poles.
Flooring.
Finish (interior).
Furniture.
Mantels.
Refrigerators.
Sash.
Stands.
Tables.

Shortleaf Pine.

Boxes.
Caskets.
Church pews.
Coffins.
Cornice.
Doors.
Flooring.
Hoppers.
Molding.
Refrigerators.
Sash.
Siding.
Window frames.

Tupelo.

Berry crates.
Butter tubs.
Candy pails.
Finish (interior).
Kitchen cabinets.
Siding.

White Ash.

Ball bats.
Boat oars.
Curtain poles.
Doors.
Flooring.
Finish (interior).
General mill work.
Handles.
Implements.
Molding.
Sash.
Sucker rods.
Trunks.
Vehicle parts.
Wagon reaches.

White Elm.

Berry crates.
Boxes.
Chairs.
Chicken coops.
Egg crates.
Trunks.
Wardrobes.

White Oak.

Boats.
Ceiling.
Chairs.
Coops.
Couch frames.
Curtain poles.
Doors.
Finish (interior).
Flooring.
Handles.
Hat racks.
Hoppers.
Plow stocks.
Porch seats.
Refrigerators.
Screws.
Tables.
Wagon stock.

White Pine.

Boxes.
Ceiling.
Coffins.
Molding.
Patterns.
Siding.
Wagon boxes.

Yellow Poplar.

Berry boxes.
Car construction.
Caskets.
Ceiling.
Crates.
Curtain poles.
Furniture.
Mantels.
Molding.
Porch seats.
Sash.
Screens.
Siding.
Tables.
Wagon beds.

Directory.

Below is a list of Tennessee wood-using manufacturers who supplied the data contained in this report. Those manufacturing several products classified under different industries will appear in the list, with their addresses, under more than one industry.

Agricultural Implements.

Chattanooga Implement & Mfg. Co. ..... Chattanooga
Chattanooga Plow Co. ..... Chattanooga
Newell & Sanders Co. ..... Chattanooga
The Harriman Mfg. Co. ..... Harriman
C. D. High & Co. ..... Hartsville
Wells-Jones Plow Co. ..... Jackson
Harris Mfg. Co. ..... Johnson City
The Wm. J. Oliver Mfg. Co. ..... Knoxville

Boxes and Crates, Packing.

Chattanooga Bottle & Glass Mfg. Co. ..... Alton Park
Duckworth Lumber Co. ..... Athens
Bridgeport Woodenware Co. ..... Bridgeport
Paxton Lumber Co. ..... Bristol
Acme Box Co. ..... Chattanooga
Chattanooga Box & Lumber Co. ..... Chattanooga
Chattanooga Coffin & Casket Co. ..... Chattanooga
Chattanooga Implement & Mfg. Co. ..... Chattanooga
Chattanooga Plow Co. ..... Chattanooga
Consignee's Favorite Box Co. ..... Chattanooga
Newell & Sanders Co. ..... Chattanooga
Wabash Screen Door Co. ..... Chattanooga
Riverside Lumber Co. ..... Columbia
Cookeville Veneer Co. ..... Cookeville
Cloy & Nants ..... Dickson
A. H. Leathers Handle Co. ..... Dickson
Dyer Fruit Box Mfg. Co. ..... Dyer
Erwin Mfg. Co. ..... Erwin
Graysville Fruit Package Co. ..... Graysville
Ward Kent Co. ..... Greenfield
R. W. Saenger ..... Hanover
Dame Mantel Co. ..... Harriman
The Weis & Lesh Mfg. Co ..... Jackson
Holston Box & Lumber Co. ..... Knoxville
Knoxville Basket & Crate Co. ..... Knoxville
Knoxville Saw Mill Co. ..... Knoxville
Logan & Maphet ..... Knoxville
Walter Lutz & Co. ..... Knoxville
The Wm. J. Oliver Mfg. Co. ..... Knoxville
D. M. Rose Lumber Co. ..... Knoxville
Ross Lumber Co. ..... Knoxville
Electric Lumber Co. ..... Lenoir City
Hutchins & Alcott ..... McMinnville
Manchester Mfg. Co. ..... Manchester
Anderson-Tully Co. ..... Memphis
Darnell-Taenzer Lumber Co. ..... Memphis
Jorgensen Bennett Mfg. Co. ..... Memphis
Bradford Wholesale Furniture Mfg. Co. ..... Nashville
Lieberman, Loveman & O'Brien ..... Nashville
Merchants' Wire-Bound Box Co. ..... Nashville
National Casket Co. ..... Nashville
Southern Lumber & Mfg. Co. ..... Nashville
Standard Box Co. ..... Nashville
Sequatchie Handle Works ..... Sequatchie
J. E. Edwards ..... Sharon
Springfield Planing Mill Co. ..... Springfield

Car Construction

Chattanooga Car & Foundry Co. ..... Chattanooga
Gustafson Mfg. Co. ..... Chattanooga
The Wm. J. Oliver Mfg. Co. ..... Knoxville
Lenoir Car Works ..... Lenoir City
American Car & Foundry Co. ..... Memphis

Caskets and Coffins.

Bristol Coffin Co. ..... Bristol
Chattanooga Coffin & Casket Co. ..... Chattanooga
Tennessee Coffin & Casket Co. ..... Chattanooga
Cleveland Coffin & Casket Co. ..... Cleveland
Hall & Donahue Coffin Co. ..... Knoxville
Knoxville Coffin Co. ..... Knoxville
Maryville Planing Mills ..... Maryville
Southern Coffin & Casket Co. ..... Maryville
Memphis Coffin Co. ..... Memphis
John T. Walker ..... Rogersville

Chairs.

Empire Chair Co. ..... Elizabethton
Greeneville Chair Co. ..... Greeneville

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Madisonville Chair Co. ....Madisonville
Johnson-Baker-Donaldson Chair Co. ....Morristown
Larkin Company of America....South Memphis
T. A. Gunn ....Tullahoma

Excelsior.

Patton-Black Mfg. Co. ....Jackson
Knoxville Coffin Co. ....Knoxville
Knoxville Excelsior Mattress Co. ....Knoxville
Southern Excelsior Co. ....Nashville

Fixtures.

Athens Planing Mill ....Athens
Budde-Lindsay Mfg. Co. ....Jackson
Southern Seating & Cabinet Co. ....Jackson

Furniture.

Athens Table & Mfg. Co. ....Athens
Chattanooga Furniture Co. ....Chattanooga
Hunt Spring Bed Co. ....Chattanooga
W. S. Milne ....Cleveland
W. J. Oakes Chair Factory ....Columbia
J. H. Thomas & Co. ....Columbia
Erwin Mfg. Co. ....Erwin
The Greeneville Furniture Co. ....Greeneville
Exum Furniture Co. ....Johnson City
C. B. Atkins Co. ....Knoxville
The Knoxville Table & Chair Co. ....Knoxville
Walter Lutz & Co. ....Knoxville
The Proctor Furniture Co. ....Knoxville
Schaad & Rotach ....Knoxville
Tennessee Mantel Mfg. Co. ....Knoxville
Cherokee Mfg. Co. ....Maryville
Chickasaw Table Factory....Memphis
Memphis Furniture Mfg. Co. ....Memphis
Tennessee Furniture Mfg. Co. ....Memphis
East Tennessee Woodworking Co. ....Morristown
Anchor Spring & Bedding Co. ....Nashville
Edgefield & Nashville Mfg. Co. ....Nashville
Indiana Lumber Co. ....Nashville
Myers Mfg. Co. ....Nashville
Rothschild Mfg. Co. ....Nashville
Standard Furniture Co. ....Nashville
Newcomb Mfg. Co. ....Newcomb
Wolfe Bros. & Co. ....Piney Flats
T. W. Pittman & Co. ....Pulaski
John T. Walker ....Rogersville
Greenfield-Talbot Furniture Co. ....Tullahoma

Handles.

J. A. Isbell ....Baxter
Dixie Logging Tool Co. ....Chattanooga
A. H. Leathers Handle Co. ....Dickson
Fowlkes Handle Co. ....Fowlkes
W. J. Beasley ....Franklin
The Anchor Block Mills Co. ....Jackson
Unaka Handle Co. ....Johnson City
The Hartzell Handle Co. ....Memphis
Nashville Spoke & Handle Mfg. Co. ....Nashville
Sequatchie Handle Works ....Sequatchie

Miscellaneous.

National Refrigerator & Butcher Supply Co. ....Champaign
The Odorless Refrigerator Co. ....Chattanooga
Clarksville Foundry & Machine Co. ....Clarksville
Barnes Mfg. Co. ....Cleveland
H. L. Judd Co. ....East Chattanooga
W. J. & Hugh McAlister ....Fayetteville
The Weis & Lesh Mfg. Co. ....Jackson
The Wm. J. Oliver Mfg. Co. ....Knoxville
Florence Pump & Lumber Co. ....Memphis
Jorgensen Bennett Mfg. Co. ....Memphis
Lenox Broom Co. ....Memphis
National Washboard Co. ....Memphis
Oil Well & Supply Co. ....Memphis
J. T. Willingham ....Memphis
Ware & Goodwin Co. ....Trezevant

Pencil Material.

Cedar Products Co. ....Alton Park
Gulf Red Cedar Co. ....Lebanon
American Lead Pencil Co. ....Lewisburg
Houston & Liggett ....Lewisburg

Planing Mill Products.

J. E. Thompson ....Adams
J. F. Robertson & Co. ....Alamo
Donnell & Patterson ....Alexandria
J. P. Tinch ....Allardt
Athens Planing Mill ....Athens
J. A. Royle ....Athens
Baxter Planing Mill Co. ....Baxter
Cloyd Bros. ....Bristol
Paxton Lumber Co. ....Bristol
Peter-McCain Lumber Co. ....Bristol
Stone-Huling Lumber Co. ....Bristol
D. F. Hargis ....Bumpus Mills
Hudson & Durdin ....Camden
Carthage Lumber & Hoop Co. ....Carthage
T. S. Colley's Sons ....Centreville
Charleston Lumber Co. ....Charleston
Chattanooga Lumber Co. ....Chattanooga
King-Baxter Lumber Co. ....Chattanooga
Union Lumber Co. ....Chattanooga
Barnes Mfg. Co. ....Cleveland
Marshall Planing Mill ....Cleveland
The T. H. Leinart Co. ....Clinton
G. P. Mayberry ....Columbia
Riverside Lumber Co. ....Columbia
J. H. Thomas & Co. ....Columbia
Vaughn Mfg. Co. ....Columbia
Crawford, Lowe & Qualls ....Cookeville
Scott Bros. Co. ....Cookeville
S. P. Bruner & Son ....Decherd
Dickson Planing Mill Co. ....Dickson
Earle Saeger ....Dickson
Hearn Lumber Co. ....Dyer
Star Planing Mill ....Elizabethton
N. Christianson ....Erin
Erwin Mfg. Co. ....Erwin
J. K. Williams Lumber Co. ....Fayetteville
Craig Lumber Co. ....Franklin
Southall Bros. ....Franklin
Williams & Mallory ....Franklin
C. E. Northrop & Son ....Gallatin
S. D. Simpson & Son ....Gallatin
J. H. Edens ....Hampton
Stowers Lumber & Mfg. Co. ....Harriman
C. D. High & Co. ....Hartsville
E. A. Dorris & Sons ....Hendersonville
Hohenwald Planing Mill & Brick Mfg. Co. ....Hohenwald
Wilder & Leach ....Huntingdon
S. B. Edgar ....Jefferson City
Jellico Lumber Co. ....Jellico
Harris Mfg. Co. ....Johnson City
Nelson Lumber Co. ....Johnson City
Broadway Mfg. Co. ....Knoxville
Chavannes Lumber Co. ....Knoxville
F. B. Cooley & Son ....Knoxville
Knoxville Lumber Co. ....Knoxville
T. M. Michaels ....Knoxville
D. M. Rose Lumber Co. ....Knoxville
Ross Lumber Co. ....Knoxville
Brown Hunt Co. ....Lafayette
Freeman Mill Co. ....Lafayette
R. B. Freeman, Jr. ....Lafayette
A. P. Wyley ....Lawrenceburg
Wilson County Planing Mill Co. ....Lebanon
Electric Lumber Co. ....Lenoir City
B. N. McGaugh & Son ....Lewisburg
Sanders Bros. & Co. ....Lewisburg
T. Edwards ....Lexington
Draper Bros. ....Livingston
Meiers, Augustin & Co. ....Loretto
A. W. Ward Lumber Co. ....Loudon
Lynnville Lumber Co. ....Lynnville
G. H. Woolever ....McKenzie
Hutchins & Alcott ....McMinnville
McMinnville Spoke & Lumber Co. ....McMinnville
Walling Lumber & Mfg. Co. ....McMinnville
J. R. Burllason ....Madisonville
A. E. Boyce ....Manchester
City Lumber Co. ....Martin
Bittle & Hufstetler Co. ....Maryville
Maryville Planing Mill ....Maryville
G. N. Mize ....Maryville
Clinton Lumber Co. ....Memphis
Cole Mfg. Co. ....Memphis
Darnell-Taenzer Lumber Co. ....Memphis
George O. Friedel Lumber & Mfg. Co. ....Memphis
Lee Lumber Co. ....Memphis
Memphis Hardwood Flooring Co. ....Memphis
Moore & McFerren ....Memphis
Walden Braxton Mfg. Co. ....Memphis
York Mfg. Co. ....Memphis
W. J. Keaton ....Milan
Monterey Planing Mill Co. ....Monterey
East Tennessee Woodworking Co. ....Morristown
I. P. Fort Co. ....Morristown
J. M. Hull ....Mosheim
Perkins-Crichlow Co. ....Murfreesboro
Bradford Wholesale Furniture Mfg. Co. ....Nashville
The Davidson, Hicks & Greene Co. ....Nashville
I. N. DeHart & Son ....Nashville
Edgefield & Nashville Mfg. Co. ....Nashville
Indiana Lumber Co. ....Nashville
Kirkpatrick & Co. ....Nashville
Nashville Hardwood Flooring Co. ....Nashville
Southern Lumber & Mfg. Co. ....Nashville
Standard Box Co. ....Nashville
Tennessee Oak Flooring Co. ....Nashville
Newcomb Mfg. Co. ....Newcomb
H. B. Ault ....New Market
McCabe Lumber Co. ....Newport
L. A. Ward ....Obion
The Paris Lumber Co. ....Paris
J. B. Sowell ....Petersburg
S. T. Wakefield ....Petersburg
Wolfe Bros. & Co. ....Piney Flats
Portland Planing Mill Co. ....Portland
Tennessee Lumber Mfg. Co. ....Pottsville
J. M. Patterson & Son ....Pulaski
T. W. Pittman & Co. ....Pulaski
Tennessee Saw & Planing Mill ....Quebeck
John T. Walker ....Rogersville
Troy & Tillman ....Rutherford
Sevierville Planing Mill Co. ....Sevierville
Landers & Co. ....Shelbyville
Ransom & Frierson ....Shelbyville
F. J. Bluhm ....Smithville
O. M. Davis Jr. & Co. ....Smyrna
Carter & Potter ....Sparta
East Sparta Planing Mill Co. ....Sparta
Graham & Shackley ....Spencer
Springfield Planing Mill Co. ....Springfield
U. S. Beard ....Sweetwater
S. Young ....Sweetwater
Tellico River Lumber Co. ....Tellico Plains
Samuel Weaner ....Tracy
Trenton Lumber Co. ....Trenton
The Anderson-Stegall Mfg. Co. ....Tullahoma
Walter C. Gordon ....Tullahoma
G. T. McGhee ....Van Leer
Mansfield Bonner Co. ....Viola
Robert Patton ....Watertown
J. T. Anderson & Son ....Waverly
Lucas Land & Lumber Co. ....Waverly
Young Bros. ....Waverly
Buchanan & Gower ....Waynesboro
White Bluffs Planing Mill ....White Bluffs
J. A. Walton ....Winchester

Sash, Doors, Blinds and General Mill Work.

Athens Planing Mill ....Athens
Bristol Door & Lumber Co. ....Bristol
Cloyd Bros. ....Bristol
Reynolds Lumber Co. ....Bristol
Stone Huling Lumber Co. ....Bristol
Hudson & Durdin ....Camden
Chattanooga Lumber Co. ....Chattanooga
Chattanooga Sash & Door Co. ....Chattanooga
King-Baxter Lumber Co. ....Chattanooga
Lookout Planing Mills ....Chattanooga
Union Lumber Co. ....Chattanooga
Sewanee Lumber Co. ....Clarksville
F. L. Smith Sons Co. ....Clarksville
Barnes Mfg. Co. ....Cleveland
J. L. & J. Hughes ....Cleveland
Marshall Planing Mill ....Cleveland
The T. H. Leinart Co. ....Clinton
G. P. Mayberry ....Columbia
Vaughn Mfg. Co. ....Columbia
Earle Saeger ....Dickson
Erwin Mfg. Co. ....Erwin
Chas. E. Johnson & Bros. ....Etowah
W. J. & Hugh McAlister ....Fayetteville
Craig Lumber Co. ....Franklin
C. E. Northrup & Son ....Gallatin
S. R. Simpson & Son ....Gallatin
Dame Mantel Co. ....Harriman
American Mantel Mfg. Co. ....Knoxville
Broadway Mfg. Co. ....Knoxville
Chavannes Lumber Co. ....Knoxville
F. B. Cooley & Son ....Knoxville
H. L. Ingles Mantel Co. ....Knoxville
Knoxville Furniture Co. ....Knoxville
Knoxville Lumber Co. ....Knoxville
Nickerson Mfg. Co. ....Knoxville
D. M. Rose Lumber Co. ....Knoxville
Schubert Lumber Co. ....Knoxville
Tennessee Mantel Mfg. Co. ....Knoxville
Wilson County Planing Mill Co. ....Lebanon
Electric Lumber Co. ....Lenoir City
John J. Lutz Mfg. Co. ....Loudon
W. B. Presley ....Loudon
D. D. Smythe ....Lynchburg
G. H. Woolever ....McKenzie
J. R. Burllason ....Madisonville
Builders' Lumber Co. ....Memphis
Clinton Lumber Co. ....Memphis
Cole Mfg. Co. ....Memphis
Denton Lumber Co. ....Memphis
Lee Lumber Co. ....Memphis
Wabash Screen Door Co. ....Memphis
Walden Braxton Mfg. Co. ....Memphis
J. M. Hull ....Mosheim
Perkins-Crichlow Co. ....Murfreesboro
Williams Bros. ....Murfreesboro
Allen Bros. ....Nashville
Buchanan Bros. ....Nashville
I. N. DeHart & Son ....Nashville
R. A. Griffin & Sons ....Nashville
Home Building & Mfg. Co. ....Nashville
Kirkpatrick & Co. ....Nashville
McGinnis & Co. ....Nashville
George Moore & Sons, ...Nashville
Newcomb Mfg. Co. ....Newcomb
McCabe Lumber Co. ....Newport
T. W. Pittman & Co. ....Pulaski
Sevierville Planing Mill Co. ....Sevierville
Landers & Co. ....Shelbyville
Ransom & Frierson ....Shelbyville
O. M. Davis Jr. & Co. ....Smyrna
Hogan Bros. ....South Pittsburg
Sparta Colonial Column Co. ....Sparta
Springfield Planing Mill Co. ....Springfield
U. S. Beard ....Sweetwater
S. Young ....Sweetwater
Samuel Weaner ....Tracy City
Bransford Lumber Co. ....Union City
Robert Patton ....Watertown
White Bluffs Planing Mill ....White Bluffs

Ship and Boat Building.

T. J. Martin ....Dover
Anchor Boat Oar Co. ....Memphis
Eagle Boat Works ....Memphis

Shuttles, Spools, Bobbins, Etc.

Speyer Lumber Co. ....Algood
E. B. Chester ....Brownsville
Dorman & High ....Cookeville
J. Murchison ....Dickson
Hohenwald Block Mills ....Hohenwald
The Anchor Block Mills Co. ....Jackson
Anchor Boat Oar Co. ....Memphis

Sporting and Athletic Goods.

E. B. Chester ....Brownsville
Anchor Boat Oar Co. ....Memphis
E. G. Willingham ....Memphis

Trunks and Valises.

The G. E. MacKenney Trunk Co. ....Chattanooga
Harris Mfg. Co. ....Johnson City
Southern Trunk & Bag Co. ....Knoxville
Whittle Trunk & Bag Co. ....Knoxville
I. P. Fort Co. ....Morristown
Ewing & Hooper ....Nashville
Nashville Trunk Co. ....Nashville
White Trunk & Bag Co. ....Nashville

Vehicles and Vehicle Parts.

Beveridge & Taylor ....Bristol
E. B. Chester ....Brownsville
Buckeye Spoke Co. ....Centreville
Chattanooga Buggy Co. ....Chattanooga
The Chattanooga Wagon Co. ....Chattanooga
Chattanooga Wheelbarrow Co. ....Chattanooga
Hickory Spoke Works ....Chattanooga
Taylor Lumber Co. ....Chattanooga
Cleveland Buggy Works ....Cleveland
The T. H. Leinart Co. ....Clinton
Campbell Mfg. Co. ....Dickson
T. J. Martin ....Dover
Dresden Spoke Co. ....Dresden
Imperial Wheel Co. ....Dyersburg
Craig Lumber Co. ....Franklin
C. E. Northrup ....Gallatin
R. H. Sindle & Co. ....Gallatin
Enterprise Wagon Co. ....Greeneville
Lamons Wagon Co. ....Greeneville
W. N. Clayton ....Halls
Halls Spoke Co. ....Halls
The Mitchell Wheel Co. ....Hohenwald
Frank H. Port & Co. ....Knoxville
T. Edwards ....Lexington
J. C. Bilbrey Spoke Co. ....Livingston
J. A. McCarroll ....Loudon
Burroughs-Ross-Coville Co. ....McMinnville
Manchester Mfg. Co. ....Manchester
Bell Buggy Co. ....Memphis
Broens & McCarley Co. ....Memphis
J. C. Dix Son & Co. ....Memphis
James & Graham Wagon Co. ....Memphis
Jorgensen Bennett Mfg. Co. ....Memphis
Lilly Carriage Co. ....Memphis
Wilson & Vance ....Memphis
Standing Stone Mfg. Co. ....Monterey
Philpot Lumber Co. ....Morrison
Carver Lumber Co. ....Morristown
H. L. Witt & Sons ....Morristown
Allen Bros. ....Nashville
Rock City Spoke Co. ....Nashville
Inman Bros. ....Newbern
Pulaski Rim & Spoke Co. ....Pulaski
John T. Walker ....Rogersville
E. J. Evans & Son ....Smithville
Sparta Spoke Factory ....Sparta
N. C. Blanchard Co. ....Spring City
M. R. Campbell ....Tullahoma
Campbell & Dann Mfg. Co. ....Tullahoma
John O'Donnell ....Union City

Woodenware and Novelties.

The Weis & Lesh Mfg. Co. ....Jackson
Columbia Package Co. ....Memphis
Perkins-Crichlow Co. ....Murfreesboro
Indiana Lumber Co. ....Nashville